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Science and Imagination
in
SIR THOMAS BROWNE

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in
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EGON STEPHEN MERTON

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To my mother
and the
memory of my father

Preface

BROWNE HAS BEEN REGARDED traditionally as a stylist, and quite recently as also a scientist. As a stylist, he has been fortunate in his critics. Coleridge, Hazlitt, De Quincey, Walter Pater, Leslie Stephen, and Edmund Gosse have all discoursed upon his literary art. As an author, he has been fortunate also in his editors. Simon Wilkin and Geoffrey Keynes have, by their complete editions, enabled us more justly to evaluate his science. The opportunity has now arrived to examine the full extent of Browne's science and to study its bearing upon his celebrated imagination. No complete investigation of Browne's science has been published, though his scientific method and his physics have received some attention.¹ The relationship between the two fundamental aspects of his work, his science and his imagination, seems to have been quite unexplored.

Browne's science could not all be treated here. Its bulk would dwarf our principal topic: the influence of the science upon Browne's philosophy and art. Only a general survey of Browne's scientific interests will, therefore, be here presented, together with a sample of his scientific activities. The rest of Browne's science I hope to treat elsewhere.

In Part I we shall note the character of Browne's learning and science, shall consider his scientific method, and shall examine his work on generation—the scientific interest most influential upon his philosophy. In Parts II and III, broaching the main problem of this study, we shall inquire into the nature of the imagination, philosophic and artistic, and into the relationship between Browne's imagination and his science. We shall there watch to what extent his imagination fused the materials

of his science with those of eclectic philosophy and with those of his unique art.

The edition of Browne used is that of Geoffrey Keynes (London: Faber and Gwyer, 1928-31; 6 vols.). In order to minimize accumulation of footnotes, documentary references have been collected, in the order of their occurrence, usually at the end of each paragraph. Because of the diversification of material and because the references for each chapter are usually confined to that chapter, no bibliography has been included. References in the notes are in bibliographical form.

For reading my manuscript in whole or in part and for helpful suggestions I wish to thank Professors Irwin Edman, Donald Lemen Clark, and Ernest Brennecke, of Columbia University, and Professor Joseph Katz, of Vassar College. For stimulating advice and criticism over many years I am especially indebted to Professor Marjorie Nicolson, of Columbia University.

E. S. M.

January, 1949
Ithaca, N. Y.

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1. Learning and Science

THE CIRCUMFERENCE of Browne's being is represented by his science; the center, by his imagination. Outwardly, Browne was a physician, whose science loomed upon his horizon and sent him endlessly searching in library and laboratory. Inwardly, he was a poet, whose imagination glows in those pages which have haunted the generations since his time. The circumference determines most of his work: the encyclopedic *Pseudodoxia Epidemica*, the *Letter to a Friend*, the *Garden of Cyrus*, even the *Urn Burial*, not to mention the tracts, notebooks, and letters. The center illumines the last chapter of the *Urn Burial*, the last paragraphs of *The Garden of Cyrus*, countless paragraphs of the *Religio Medici*, and appears unexpectedly in all his writings. In this study, we shall inquire into the kind of influence Browne's science had on his imagination; we shall seek the center from the circumference.

Our first question will be: What was the range of Browne's interests? The answer is, immediately, the range of seventeenth-century learning, with the exception of those moral issues which were being newly agitated during this period, the issues of men's political and economic relationships. This range of learning is well measured in *The Anatomy of Melancholy*. Robert Burton suggests a variety of subjects for the would-be scholar, subjects which fall into two dominant categories: antiquities and science. "What so full of content," Burton asks, "as to read, walk, and see maps, pictures, statues, marbles, 'Architectures,' 'Devices,' coats of arms, old coins, 'Roman Antiquities?'" "Princes' Cabinets" abroad are especially rich in such wonders. Burton retails also the pleasures of study in history and geography, in languages and

philosophy, but he devotes most of his attention to science—studies in geometry, optics, astronomy, gardening, natural history, “secrets” of chemistry (amulets, weapon salve, elixirs of life), and those of mechanics (“diving boats,” “multiplying glasses,” “a chariot to move without an animal”). Both in range and emphasis Burton’s catalogue parallels what we find in Browne. Browne’s range includes antiquities, history, geography, the Bible, and languages; his emphasis is upon science. These interests were developed and colored by one another, as an example or two from each will show.

The *Urn Burial*, which after all pretends to be only a “brief discourse of the sepulchral urns lately found in Norfolk,” sufficiently evinces Browne’s interest in antiquities. The relics which strew that work are, however, not only reminders of the past; they are likewise data for the present. Mummy is anatomical for Browne as well as antique. “The Egyptian mummies that I have seen,” he records, “have had their mouths open and somewhat gaping, which affordeth a good opportunity to view and observe the Teeth, wherein ’tis not easie to find any wanting or decayed. . . .”² Browne’s antiquarianism is impregnated with his science, and so is his history. History can be for him indeed only a more sober kind of antiquarianism, the record of time, which antiquates antiquities.) What song the Sirens sang, or what name Achilles assumed when he hid himself among women, such questions stimulated Browne’s historical sense. His learning, however, is not only whimsical. The “Notes for Dugdale’s History of Embanking and Draining” deal with practical matters like the ditches and roads of the Egyptians, the Chinese, the Romans, and the Saxons.³ The *Urn Burial* exhibits an amazing fund of learning on the technics and the parades of death among ancient peoples. Browne’s interest in geography touches upon topics closely allied to these mentioned. He wonders about such questions as Hannibal’s route over the Alps, the location of ancient rivers,

lakes, and seas. Egypt always interests him: the rain in its desert, the mud in its basin.⁴ Of the seven books in the *Pseudodoxia*, two are devoted to vulgar errors in history, geography, and Scripture; they treat such subjects as the seven heads of the Nile, the redness of the Red Sea, Pope Joan, the death of Aristotle, and the wandering Jew. For all the interests so far mentioned, Browne culled the Bible. His knowledge of this book, its texts and commentary, is remarkable, even for his day. The longest of his tracts is upon the plants mentioned in Scripture.⁵ The astonishing wealth of this catalogue testifies to his careful sifting of the Biblical text, a sifting whose motives were scientific and historical as much as theological. Associated with all these interests is his study of languages. He tells us that "beside the *Jargon* and *Patois* of several Provinces, I understand no less than six Languages." His tract, "Of Languages and particularly the Saxon Tongue," surveys the languages of the world, considers the origin of European tongues, notes the influence of Greek on Anglo-Saxon, the uniqueness of Basque, and the ingredients of English.⁶ In linguistics, no less than in Biblical scholarship, geography, history, science, and antiquarianism, Browne amazes us with the variety of his learning.

Versatility is not seldom suspect. Concerning Browne's, a question now arises: Was he only a showman in learning or was he a professional scholar? The range of his interests affords a noteworthy parallel to that of the typical dilettante of the seventeenth century, the "virtuoso" ridiculed in Shadwell's play of that name, the "gentleman-scholar," who studies for his own curiosity, delight, or reputation, as contrasted with the Baconian philosopher, who studies for the benefit of mankind.⁷ The years of Browne's maturity, moreover, coincide with the great period of virtuosity, from 1640 to 1680, one in which science, Browne's specialty, gradually displaced antiquarianism and painting as the major concern of the virtuoso.

As a roving antiquarian, Browne's interests and attitudes would seem to bring him close to the virtuoso type, of which John Evelyn was the supreme embodiment. Comparison between Evelyn and Browne may, therefore, help to elucidate the character of Browne's virtuosity. Evelyn was a connoisseur of wonders—of ancient coins, pictures, strange phenomena of nature and ingenious inventions of man. His *Diary* is, to a large extent, an account of his discoveries of such wonders. As an example, let us examine his description of the collection of a noble Venetian, *Signor Rugini*: "He has a stately Palace, richly furnished with statues and heads of Roman Emperors, all placed in an ample room. In the next, was a cabinet of medals, both Latin and Greek, with divers curious shells and two fair pearls in two of them; but, above all, he abounded in things petrified, walnuts, eggs in which the yolk rattled, a pear, a piece of beef with the bones in it, a whole hedgehog. . . ." A romantic sense of awe and wonder pervades Evelyn's attitude toward learning and science. In Browne, whom he admitted as "the most obliging of all my correspondents," he may have thought he found a spirit in accord with his own. The *Pseudodoxia*, of which Evelyn possessed a copy, undoubtedly appealed to his taste for the marvelous, as did Browne's house, a visit to which he describes in some detail:

his whole house and garden being a paradise and cabinet of rareties, and that of the best collection, especially medals, books, plants, and natural things. Amongst other curiosities, Sir Thomas had a collection of the eggs of all the fowl and birds he could procure, that country (especially the promontory of Norfolk) being frequented, as he said, by several kinds which seldom or never go farther into land, as cranes, storks, eagles, and variety of water-fowl.⁸

Browne's choice of subjects and his methods of composition often do indicate certain affinities with the virtuoso. He loves to

lose himself in a mystery, to wander in the America and untraveled parts of truth. Coleridge truly characterized him as a "hunter after oddities and strangenesses." The subjects of his books were always flexible enough to permit quixotic adventures upon the little traveled roads of history and nature. "In this multiplicity of writing," he says in dedicating *The Garden of Cyrus*, "bye and barren Themes are best fitted for invention; Subjects so often discoursed confine the Imagination." And thus he chose the subject of the "quincuncial losenge," which could be "artificially, naturally, mystically considered." His attitude toward learning in general sometimes indicates some of the virtuoso's romantic sensibility; studies serve for delight, for ornament, and for ability. "Flat and flexible truths are beat out by every hammer." From his earliest days, he confesses in the *Religio Medici*, he had this attitude. His "greener studies" were polluted with heresies "old and obsolete, such as could never have been revived, but by extravagant and irregular heads as mine." "Where did the soul of Lazarus wait when he was raised from the dead, what legal title might he have to his possessions after being so raised, who would arise with Adam's rib at the Resurrection—Adam or Eve, such "doubts, never yet imagined or questioned," were fair game for this hunter of strangenesses. His subjects were extravagant and irregular, and so were his methods of composition. (His writings are often little more than patchworks of digression.) The Pseudodoxia, the Religio Medici, the Christian Morals, the Letter to a Friend, the Urn Burial, the Garden of Cyrus, none of them clearly develops a central point of view. Indeed the difficulty in studying any one topic, such as Browne's science, is that so much of it has to be quarried from a mass of casual comment. (His is an eclectic rather than a philosophic mind. He does not pursue a problem in all its implications, but glances over many problems.) In this respect he is rather like Evelyn, for whom all learning, as well as all Europe, became the scene of a "grand tour."

However, if Evelyn thought he found in Browne a spirit in conscious accord with his own, he was mistaken. Consciously, Browne dissociated himself from the tradition of the virtuosos—indeed from the tradition of the humanists. Even in his own humane art, even on the subject of antiquities, he disclaims antiquarianism. "We were hinted by the occasion," he says in the *Urn Burial*, "not caught the opportunity to write of old things, or intrude upon the Antiquary. We are coldly drawn unto discourses of Antiquities, who have scarce time before us to contemplate new things, or make out learned Novelties." A strange statement, this, to preface what is probably the greatest literary expression of all antiquarianism. In his own eyes, Browne was not a polite gentleman, nor even a polite author, but a scholar and a scientist. Though, clearly, he shared with Evelyn the instinct of a collector, he would certainly have avowed himself to be "coldly drawn" to the delights of collecting, to any such idle song of an empty day. The instinct was channeled by him into the busy arenas of learning and science. Browne was a student both of "natural things" such as the eggs and plants in his cabinet of rareties, and of antiquarian items such as the medals and books. His medal lore is evinced in the provocative fragments of the "Notes on Medals"; his book lore is written large throughout his works. Toward the gentlemanly pursuit of antiquarianism, his attitude is critical and amused, certainly not sympathetic. In his *Musaeum Clausum; or, Bibliotheca Abscondita: Containing Some Remarkable Books, Antiquities, Pictures & Rareties of Several Kinds, Scarce or Never Seen by Any Man Now Living*, he even compiled a catalogue subtly satirizing the the virtuoso's sensibility.¹⁰ Browne may have possessed the tastes of a gentleman, but he was determined to be more than that.

The curious ambiguity of Browne's position with regard to the virtuoso—a certain affinity with and a conscious rejection of the attitude he represents—is related to a more crucial ambiguity in

his character, one which has resulted in some bewilderment and much disagreement among his critics. Why does he refer so little to the great authors, in view especially of the overwhelmingly allusive nature of his writings? Did he read Homer, Sophocles, Virgil, Dante, Chaucer, Shakespeare? Did he read them for pleasure, or only for the scientific and historical references which he occasionally makes to them? His chief acknowledgments—like his chief subjects, which yet he can turn to the purposes of supreme art—are in the fields of science and history. He seems to prefer, on his own evidence, the commentators to the poets. Yet the subtler evidence of his own art would lead one to infer that works of imagination appealed to him as well as works of science. The ambiguity here is, like that of his virtuosity, the result of a conflict within Browne. The man of science could inhibit the man of letters; the scholar could subdue the gentleman. Browne's ambition conflicted with his gift; his ambition was to be thorough and professional, his gift to be discursive and lyrical. The imagination which buds and blossoms in Browne's science, philosophy, and art—rooting itself in the first and turning fruitful in the other two—that imagination was a plant of wild growth. It came gratuitously. For Browne's own part, it might waste its sweetness on the desert air; he never cultivated it, or never admitted cultivating it, for its own sake. Of learning and science, on the other hand, Browne was ever a champion, tilting against what in the end he may well have regarded as his own infirmities. Thus his criticism of the mere collecting of ideas—a pursuit at which he was most proficient—can be as sharp as that of the collecting of antiquities. (He condemns, for example, discursiveness in learning.) There are too many books in the world, too many libraries! The result is that the wisest heads prove almost all skeptics at last, and stand like Janus in the field of knowledge. He knows only too well whereof he speaks. His desire is to reduce learning to "a few and solid Authors; and

to condemn to the fire those swarms and millions of Rhapsodies, begotten only to distract and abuse the weaker judgements of Scholars, and to maintain the trade and mystery of Typographers." Especially is there too much literature. Against literary works he brings the ancient charge that they are historically and scientifically false. From early training in the classics, we gain not a true notion of nature, but only a store of pedantic allusions, "driving at these as the highest elegancies, which are but the frigidities of wit." So strong is Browne's scientific bias against "culture," that he feels it were no loss like that of Galen's library if the whole heritage of literature were lost to posterity! "For were a pregnant wit educated in ignorance hereof, receiving only impressions from realities; upon such solid foundations, it must surely raise more substantial superstructions, and fall upon many very excellent strains, which have been jusled off by their intrusions."¹¹ Browne stands among the ranks of the humanists certainly in spite of himself.

Among the ranks of the scientists Browne stands by dint of lifelong application. If romantic virtuosity is modified in Browne's scholarly, even inhumane, attitude toward learning, it is transformed in his professional attitude toward science. (Browne is a disciple in the school of Francis Bacon,) if a heretic in the school of Evelyn. Evidence of Browne's seriousness in science will appear later. Only a few salient points need be noted here to distinguish Browne as scientist from the dilettante or virtuoso.

(Eager curiosity, patient observation, extensive experimentation, intensive reading, all these traits of a research scientist mark Browne. The motives which led him to this research align him with the Baconian, as opposed to the virtuoso, tradition.) His ceaseless activity, he feels, is for the benefit of mankind, not for personal enjoyment or profit. "The true and lawful goal of the sciences," Bacon had said, "is none other than this: that human

life be endowed with new discoveries and powers." The virtuosi, in contrast, kept to the ancient, even prehistoric, tradition of the secrecy of knowledge, of special wisdom revealed only to the initiated. This snobbish attitude is evident, for example, in Evelyn's refusal to publish his essays on painting because in so doing he would "debase much of the esteem by prostituting them to the vulgar." Browne's position is unequivocal. He regards it as a Christian duty to impart the fruits of his study. "I make not . . . my head a grave, but a treasure of knowledge; I intend no monopoly, but a community, in learning; I study not for my own sake only, but for theirs that study not for themselves." (He shares none of the virtuoso's, or the Renaissance humanist's, desire for fame.) After his death, he declares, he wants no monument, biography, or epitaph, not so much as the bare memory of his name to be found anywhere but in "the universal Register of God." During his life, he liberally expended upon fellow inquirers the precious time saved from his arduous practice. Scholars and scientists came to him for help, such men as Henry Power, William Dugdale, Elias Ashmole, Christopher Merrett, William How, and John Ray. Gladly would he learn, and gladly teach, pursuing "the duty of a devout and learned admiration" toward the secrets of nature. The admiration is especially learned. With Browne, as with Bacon, it is the concealed mechanisms, not the apparent marvels of nature which are significant. Through the marvels of nature, Bacon had said, "the understanding is raised to the investigation of formes capable of including them." Such a view is in sharp opposition to the tone of wonder which dominates, let us say, Evelyn's descriptions of marvelous phenomena. Browne's encyclopedia of vulgar errors, the *Pseudodoxia*, is a direct application of this Baconian view. Addressing himself to those worthies "who endeavor the advancement of Learning," he proposes to attack those very marvels

which the virtuoso cherishes. To spread wider the net, he only wishes that his project had "fallen into the endeavors of some co-operating advancers."¹²

Browne, then, is a Baconian as well as a virtuoso, a Baconian in his scientific, if a subdued virtuoso in his antiquarian, interests.¹³ Even though he presents us with no unified scientific treatise, his scientific activities were painstaking, persevering, and professional. Alexander Ross, with an unfailing instinct, placed Browne in proper company when he entitled his book, *Arcana microcosmi . . . with a Refutation of Doctor Browne's Vulgar Errors, the Lord Bacon's Natural History, and Doctor Harvey's Book de Generatione*.

If, now, we accept Browne as a scientist in good earnest, our next question is: What were his scientific interests? These interests, like those of his learning in general, extended to the limits reached by his time. They penetrated to the depths as well, within the area of his profession—natural history, anatomy, physiology, and medicine. This area he cultivated *con amore*. His physical sciences—chemistry, mineralogy, astronomy, magnetism, and electricity—became significant for him, almost always, in so far as they shed illumination upon his biological sciences. His vocation became also his avocation. The evidence from Browne's tracts, notebooks, and letters; from all his imaginative works; from the *Pseudodoxia* (especially the new material added in successive editions of that work); from his scientific collection at Norwich; not to mention the circumstantial evidence of his academic training and professional career—all indicates that Browne's paramount scientific interest was biology. The significance, and even the existence, of this fact has hitherto been quite ignored, yet Browne's very life and works reflect it.¹⁴ Of the authorities most frequently referred to in the *Pseudodoxia*—Pliny, Aristotle, Scaliger, Galen, Aldrovandi, Gesner, Belon,

Aelianus, Albertus Magnus, the Bible, Brassavolus, Matthiolus, Cardan, Boetius, Kircher, Herodotus, Plutarch, and Paracelsus—about half wrote on strictly biological subjects. Such authors would have predominated in Browne's academic training, in all his medical studies,¹⁵ which studies served as the focus of his biological interests.

It is interesting to speculate on how Browne was led to these medical studies, on why he became a physician. The progress of medicine has been characterized as a succession of forgotten theories. In the seventeenth century it was a field rich in the occult as well as the experimental. It would appeal to the poet as well as the scientist in him. This profession, "whose study," as he tells us, "is life and death," concerns itself with two of the subjects which strike to the core of Browne's imagination. He observes that "physick" "leadeth us into many truths that pass undiscerned by others," and he tells us that he honors it for giving man the greatest wisdom possible, a knowledge of himself. His love for his profession supplied the stimulus for the enthusiastic, sustained, and imaginative scientific activity which filled his life. Those letters in which he reveals himself most completely, the letters to his older son, Edward, are full of medical talk; up to the very end, less than half a year before he dies, at the age of seventy-seven, he bustles with accounts from his practice and with advice for Edward. His letter on how to become a physician reveals a perfectionist. The course outlined is as idealistic in its way as is Milton's tract on education. The "but few books" Henry Power is to read constitute almost a bibliographical history of medicine.¹⁶ Browne's desire was to become a master of his profession, of all connected with life and death.

As a biologist, Browne's ties are with both the ancients and the moderns. His three chief interests, besides medicine—natural history, anatomy, and physiology—were also those most im-

portant in the history of biology. They were the basic interests of Aristotle, to whom Browne owes his greatest debt. Aristotle's principal works, aside from his logic, were the *History of Animals*, the *Parts of Animals*, and the *Generation of Animals*. These were always at Browne's elbow. Indeed the parallel between Aristotle and Browne is a close one. A knowledge of the author's biology is in each case important for a complete understanding of his philosophy.¹⁷ Aristotle's emphasis was upon dynamic processes, upon change, movement, growth, and decay. The phenomena of life he had divided into three main groups: growth and reproduction, sensation, and locomotion. Of these the most fundamental was the first, Aristotle's main interest being in the nature of sexual reproduction.¹⁸ Browne has precisely the same approach and the same specialty. Browne's general emphasis upon change, movement, and growth is exemplified in all his scientific concerns—in magnetic and electric attraction; in fermentation, coagulation, and decomposition; in generation, digestion, respiration, and circulation. The most ubiquitous topic in his writings is that of generation. Browne's Aristotelian bias is, of course, that of his age, notwithstanding Bacon and the rising school of experimental scientists. Aristotle's was the most important influence of the day; his works on natural philosophy, together with the works of such medical authors as Hippocrates, Galen, and Avicenna, constituted the core of the curriculum of the Padua school of medicine, at which Browne had studied, and which was dominant in all Europe.¹⁹

Browne's special, as well as professional, concern is with anatomy and physiology. This special concern relates him also to the moderns. The seventeenth century was the great age of research in anatomy and physiology, the foundations of which had been laid by Andreas Vesalius and by William Harvey. John Wallis, in enumerating the subjects discussed at the weekly meetings of the "Invisible Society," places "Physick" and "Anatomy"

first, and then details discussions on physiology—on the great discovery of the day, the circulation of the blood.²⁰ Browne's preoccupation with anatomy and physiology is of course a preoccupation with the complementary aspects of living organisms: structure and function, body and soul. About structure he, like his contemporaries, knows more, and that he stresses. "Lay your foundation in Anatomy," he had enjoined Henry Power.²¹

The empirical basis for both his anatomy and physiology was his "physic." The empirical aspect of his profession is most clearly exemplified by its emphasis upon materia medica. This emphasis is justly reflected in Browne's writings: aside from generation, the subject to which he most frequently refers is that of diseases and their remedies.²² Diagnosis and prescription were after all his stock in trade. The routine of his practice was Browne's point of departure for his long theoretical excursions in biology, excursions following the convenient landmarks of Aristotle and Galen, but ever broaching the terra incognita of modern research.

Browne's biological sciences are nowhere clearly formulated. His medicine and natural history, and even more his basic sciences, anatomy and physiology, must be gathered from mossy, winding ways in a jungle of discussion and digression. Only one of Browne's works deals specifically with his biology, and that as part of a more comprehensive, indeed an encyclopedic, scheme. This work is the *Pseudodoxia*, the only visible product of all Browne's scientific activity. Its title, *Pseudodoxia Epidemica; or, Enquiries into Very Many Received Tenets, and Commonly Presumed Truths, which Examined Prove but Vulgar and Common Errors*, is somewhat misleading. This book was the fruit of experience, of reading and thinking over many years. It is not just an attack upon vulgar errors, but equally a defense of scientific truth. It was frequently revised in the light of new findings;

six editions, most with new information, appeared over a period of twenty-six years. In it Browne devotes as much attention to what is true as to what is false. Much of our information concerning Browne's sciences comes from incidental light he sheds in his refutation of superstitions. Indeed, the choice of superstitions for inclusion in the *Pseudodoxia* may well have been determined by the kind of scientific information their refutation would depend upon. The scientific information is, therefore, perhaps not so much the digression it sometimes appears on the surface as the impetus which led him to his subject in the first place. The *Pseudodoxia* is Browne's magnum opus as a scientist, founded upon a catalogue of popular errors. It is addressed not to the vulgar, who have perpetuated the errors, but to the learned, who can grasp the science. Among the learned, his "Brothers in Physick" will profit from it, "whose knowledge in Naturals will lead them to a nearer apprehension of many things delivered." ²³

The *Pseudodoxia* is, naturally, both ancient and modern. Regarded as the work of an "ancient," it could be classified with the traditional encyclopedias. It is one of the last statements of the old science as well as one of the first of the new. "Authority" is, after "experience" and "reason," a guide for Browne in the quest for truth. Though with important differences, the *Pseudodoxia* is another of the Renaissance encyclopedias of science, like those of Caxton, Batman, and Primaudaye, forming part of that long tradition whose original classic was Pliny's *Natural History*. Of this tradition and of its debt to Pliny, Browne was himself quite aware.²⁴ The subjects in which Browne was most interested—animal, plant, and mineral lore, diseases with their causes and cures, man's body with its parts and qualities, numbers, travel lore, scriptural history—these were the staples of "mirror" literature. The influence of this literature can be discerned in the plan and execution of the *Pseudodoxia*. Its plan follows the great chain of being. After dealing with the causes of errors in the first book,

Browne takes up in succeeding books errors concerning "Mineral and Vegetable bodies," animals, and man. His remaining books are devoted to miscellaneous subjects: errors in pictures, in geography and history, and in Scripture. His departure from typical procedure is the omission of a section on cosmological lore, a subject our review of his interests has shown he scanted. In execution, too, the *Pseudodoxia* shows the influence of the encyclopedias. Not only does Browne depend upon the authorities whom he combats,²⁵ but he considers his subject from the traditional points of view. Even the naturalists of the sixteenth century—Konrad von Gesner, Ulisse Aldrovandi, Guillaume Rondelet, and Pierre Belon, authors who were always near Browne's desk—had viewed their animals and plants from more angles than that of natural science. Their other interests included the grammatical, literary, and antiquarian, the medical and practical, the moral and religious, the marvel mongering and magical.²⁶ All these points of view Browne includes.

The modernism of the *Pseudodoxia* is attested by the attack upon it by that indomitable champion of the ancients, Alexander Ross. Although Browne may depend upon the encyclopedic tradition, he does not do so in the same way as do, let us say, Stephen Batman or Pierre de La Primaudaye. The difference is that Browne's scholarship is more conscientious, his science more professional. The scholarship of the *Pseudodoxia* Browne formally presents in his preface. Before the learned reader, he argues his claim: no one has yet covered his subject—"we find no open tract, or constant manuduction in this Labyrinth; but are oft-times fain to wander in the America and untravelled parts of Truth." Various authors have dealt with vulgar errors in medicine, but inadequately, and anyway such errors he excludes from his purview.²⁷ The *Pseudodoxia* is scholarly, but more than that, it is fresh. Browne's case as a modern rests upon the science of the *Pseudodoxia*. This is not a staple uncritically inherited from encyclo-

pedic tradition, but the product of Browne's own painstaking research. Furthermore, Browne's own conception of his work is Baconian. In the *Advancement of Learning*, Bacon had suggested the registering of doubts and errors; for the one *Calendars of Doubts*, which would be thoroughly sifted and so gradually resolved; for the other a *Calendar of Popular Errors*, "chiefly in natural history, such as pass in speech and conceit . . . that man's knowledge be not weakened nor imbas'd by such dross and vanity." Browne's purpose is not only to register but, further, to combat. In his own eyes, Browne was a modern, writing an anti-encyclopedia. In the cause of "the advancement of Learning" he would "timely survey our knowledge, impartially singling out those encroachments which junior compliance and popular credulity hath admitted." His prime criteria would be experience and reason. For the execution of such a project, Browne endorses the Baconian proposal of co-operative research. Such a work as his, he says, "did well deserve the conjunction of many heads. And surely more advantageous had it been unto Truth, to have fallen into the endeavors of some co-operating advancers."²⁸ If, therefore, we associate the *Pseudodoxia* with the encyclopedic tradition, we must do so with the caution that its author, trained in the library and in the laboratory, wrote ostensibly to attack that tradition, not to provide another best seller for middle-class culture. Its author was an uncommon physician—a universal scholar who profited from all the learning of his age and a Baconian scientist who delved deep into the biological sciences of his profession. With the power of a rare imagination, he pursued especially the study of life and death, a study which bore fruit in his science, his philosophy, and his art.

2. *The Quest for Truth*

WITH WHAT CHARTS does Browne embark upon the quest for truth, the mysterious goal of all learning and science? Specifically, if science is the controlling element in the great range of Browne's learning, what scientific method emerges from the *Pseudodoxia*, the ripe product of all his scientific activity? The question is ultimately one of epistemology: What is Browne's diagnosis of those diseases of the mind which impede the attainment of truth, and what is his prescription?

What is truth? said jesting Pilate; and would not stay for an answer. Sir Thomas Browne in a sense stayed all his life for an answer. Though the nature of truth be doubtful, though it be "Janus-faced" and like the Delphian sword will cut on two sides, though it be "that obscured Virgin half out of the Pit," its quest is for Browne the characteristic occupation of man. The quest in its larger aspect exercises all the faculties of man, his sense and his reason, his faith and his imagination. It is an adventure in both science and religion, by the former exploring the world of nature, by the latter approaching the City of God. The scientist etches a visible picture of that invisible reality which is enjoyed by the mystic. The "hieroglyphs" of nature, when grasped by sense and interpreted by reason, can lead to an imaginative reconstruction of the articles of faith. Hence Browne's insistence upon scientific method—the disciplining of sense and reason—which here concerns us. Hence his condemnation of those "sedentary curiosities" who, though "constellated unto knowledge," rest in doubt of things which may be verified, and thus fail "in the intention of man it self."¹ Early in his life Browne fell in love with that obscured virgin half out of the pit, and she remained

his ruling passion to the end. The pure, Hellenic love of truth is the stimulus for all Browne's intellectual activity.

The scientific exploration of truth has two aspects: first, the obstacles to its quest must be recognized—the causes of human error must be analyzed; and, second, a definite procedure for its attainment must be followed. Both these aspects were being studied in Browne's day. Bacon, we know, had been much concerned with them. Regarding the first, Bacon had in the *Advancement of Learning* discussed the "peccant humors," the "diseases" of the mind; in the *De Augmentis* he had discussed "fallacies"; and especially in the *Novum Organum* he had described strikingly the "idols of the human mind."² This description of the idols, perhaps the best known part of the *Novum Organum*, has commonly, and hastily, been taken as the basis for Browne's analysis of the causes of error.³ (A comparison between Bacon's idols and Browne's causes should, therefore, elucidate the nature of Browne's diagnosis and measure the extent of its debt to Bacon.)

Bacon's idols are four in number: idols of the tribe, of the cave, of the market place, and of the theatre. The "Idols of the Tribe" are concerned with the innate weakness of the understanding in the tribe or race of men. They include man's tendency to take his sense as the measure of things, to believe positive assertions more often than negative, to feign parallels and similitudes where none exist, to rationalize beliefs that are already held, to be unduly influenced by sudden and simultaneous impressions. The "Idols of the Cave" are concerned with the weaknesses in mental equipment or in education of the individual, whose vision is blunted by circumstances peculiar to him, the weakness characteristic also of Plato's cave dwellers. They include the individual's tendency to view truth from only his specialized field, to notice differences rather than resemblances or resemblances rather than differences, to stress antiquity or mo-

dernity, to reverence particular authorities. The "Idols of the Market Place" are concerned with the association of words with things and are "the most troublesome of all." The problem here is one of semantics. As abstractions, words may be false in two ways: they may be names for things which do not exist; or they may be erroneous names for things which do exist. Of the former kind Bacon gives such abstractions as "Fortune," "the Prime Mover," "Planetary Orbits," "Element of Fire"; of the latter kind he gives an abstraction such as "humid," which is "nothing else than a mark loosely and confusedly applied to denote a variety of actions which will not bear to be reduced to any constant meaning. For it both signifies that which easily spreads itself round any other body; and that which in itself is indeterminate and cannot solidize. . . ." ⁴ Bacon mentions levels of abstraction, from the lowest level, consisting of names of such substances as "chalk" and "mud" about whose reference there is no doubt, through a more faulty level—names of such actions as "to generate," "to corrupt," "to alter"—to the most faulty level—names of such qualities as "heavy," "light," "dense," "rare." The "Idols of the Theatre" are concerned with misconceptions of truth arising from false systems of philosophy or from perverse rules of demonstration: "all the received systems are but so many stage-plays, representing worlds of their own creation after an unreal and scenic fashion." ⁵ The general fault of all such systems is that of hasty induction from too few instances. Three schools of philosophy are criticized: (1) the Rational or Sophistic, which snatches from experience a few common instances and leaves all the rest to "agitation of wit"—a school represented by Aristotle; (2) the Empirical, which educes a system from a few experiments and wrests all other facts "in a strange fashion to conformity therewith"—a school represented by the Alchemists and by Gilbert; (3) the Superstitious, which mixes its philosophy with theology, abstract forms, final causes,

and first causes—a school represented by Pythagoras and Plato.

Let us now examine Browne's causes of error. Browne discusses six general causes: the common infirmity of human nature, the erroneous disposition of the people, credulity, supinity, adherence to authority and antiquity, and the endeavors of Satan. If this is a version of Bacon's idols, it is certainly a garbled one. A loose parallel, and the only one at all between the two analyses, may be drawn between Bacon's Idols of the Tribe and Browne's *common infirmity of human nature*. However, where Bacon analyzed the innate weaknesses of the human mind, Browne discusses the deception of our first parents (by Satan, by one another, by their senses, by their misapprehension of God's command) and various "erroneous conceptions" in "the relations of Scripture before the Flood." ⁶ Browne does not discuss the innate weaknesses of the human mind which Bacon listed under his Idols of the Tribe.

Under *the erroneous disposition of the people* Browne treats of weaknesses peculiar not to mankind at large, but to "the most deceptible part of mankind," ⁷ the vulgar, a distinction which finds place in none of Bacon's idols. The principal weakness here is that the higher faculties are dominated by the lower, understanding is dominated by sense and passion. The understanding "submitteth to the fallacies of sense, and is unable to rectify the Error of its sensations." Thus the vulgar conceive that the earth is bigger than the sun, the fixed stars smaller than the moon; to them rhetoric appeals more than logic, parables and proverbs more than propositions and demonstrations; they are deceived by priests, physicians, astrologers, fortune tellers, and politicians. As an aspect of the erroneous disposition of the people, Browne also discusses fallacies, which he divides into verbal and real: (1) The verbal fallacy is a literal interpretation of a metaphor. Thus Pythagoras's injunction to his disciples to abstain from beans was not a dietary but a political one, an injunction against

holding office, "for by beans was the Magistrate elected in some parts of Greece." Under this verbal fallacy, or "fallacy of Equivocation," are comprehended "all deductions from Metaphors, Parables, Allegories unto real and rigid interpretations."⁸ It will be seen that Browne here is not, as has been claimed, concerned with Bacon's Idols of the Market Place, the semantic problem, which Bacon's brilliant insight pierced, of the inadequate reference of abstract words to the things they are supposed to name.⁹ (2) Browne's real fallacies are four in number, all common fallacies of Aristotelian logic: argument from a false premise, argument from a partially false premise,¹⁰ false argument from cause to effect, and false argument from effect to cause.

Browne's other causes of error are almost self-explanatory. The third is a very general one, *credulity*, "a weakness in the understanding . . . whereby men often swallow falsities for truths. . . ." As a weakness of understanding it resembles the preceding cause, except that it appears in "wiser brains" as well as "vulgar heads"; it is exemplified in pagan religious beliefs. The fourth cause is *supinity*, a neglect of observation; criticism of such neglect is certainly a Baconian formula, but not a Baconian idol. The fifth cause is "the mortallest enemy unto Knowledge," *adherence to antiquity and authority*. It is the "resignation of our judgments," and is of course intimately connected with the preceding cause, supinity or "neglect of Enquiry." To it Browne devotes more attention than to any other cause, reflecting the attitude of the new Baconian science, of the moderns against the ancients. He analyzes the weaknesses of antiquity (its false doctrines, reliance on fables, commonplace sayings), illustrates the insufficiency of authority as proof in the sciences, and enumerates the authors responsible for the tradition of error, there being "scarce any tradition or popular error but stands also delivered by some good author." Browne's last cause of error is the *endeavors of Satan*. Satan deludes man in five main points: he in-

stills the beliefs that there is no God, that there are many gods, that he himself is God, that artificial magic may charm Satan or counteract his power, and that Satan does not exist at all. In addition Satan inclines us to a reliance on magic and to a belief in astrology, in auguries and divinations, in charms, amulets and other occult cures for diseases, in speculative delusions (as that the sun, moon, and stars are living creatures, that spirits are corporeal, that the female sex has no generative emission); finally, he hunts after "simple lapses," as that there is another world in the moon or that the sun is no bigger than it appears.¹¹

A comparison of the two analyses can lead only to the conclusion that Bacon's idols had become dim in Browne's memory, if they existed there at all, when he wrote on the causes of error in the first book of the *Pseudodoxia*. We may note that Browne nowhere mentions the idols in his discussion and that his general classification and individual descriptions are unlike Bacon's. We have already, in comparing Bacon and Browne, noticed (1) the weakness of the parallel between Bacon's Idols of the Tribe and Browne's common infirmity of human nature, (2) the absence in Bacon of Browne's second cause, the erroneous disposition of the people, and (3) the difference between Bacon's Idols of the Market Place and Browne's verbal fallacies, both of which, on the surface, treat of words. Of Browne's other causes—credulity, supinity, adherence to authority and antiquity, and the endeavors of Satan—only one offers a clear resemblance to anything in Bacon's description of the idols. Browne's adherence to authority and antiquity recalls a passing remark by Bacon to a favorite subject—the superiority of the moderns to the ancients—a subject which Bacon more amply and more pointedly treats elsewhere.¹²

• Browne's diagnosis of the causes of error can be termed Baconian only in the loosest sense. It should not be taken, as it has

commonly been taken, as a version, perhaps somewhat muddled, of Bacon's idols. Its debt is not a specific one to Bacon¹³ but rather a general one to that new experimental philosophy which Bacon so forcibly echoed. Browne reflects those ideals—the need for observation and for the inductive method, the attack on authority and antiquity—which are fundamental to and pervasive in all Bacon's treatment of the sciences, ideals which are not limited to, or especially significant in, Bacon's treatment of the idols. Furthermore, they are ideals pervasive not only in Bacon but in the general climate of opinion to which Browne, as well as Bacon, was so responsive. They are ideals which had been practiced before Bacon was born.¹⁴ Browne's diagnosis of the causes of error is Baconian only in the sense that it shares the popular scientific attitudes which became identified with Bacon's name. In its details of description and classification, as an original synthesis, it is as native to Browne as the idols themselves are to Bacon. Like Bacon's, it is an independent, if less brilliant, critique by a modern scientist of the causes of ancient error.

Having, in the first book of the *Pseudodoxia*, cleared the obstacles to the quest for truth, Browne thereafter illustrates his program, what may loosely be called his "scientific method." From his diagnosis of the causes of error we are led naturally to his prescription. The prescription can indeed be elicited from the diagnosis: *experience*, as against the neglect of observation and experiment due to supinity; and *reason*, as against the common infirmity of human nature and the erroneous disposition of the people. *Authority* is sometimes included as a poor third in this list. Although Browne refers to "the three Determinators of Truth, Authority, Sense, and Reason," and although he certainly depends upon authority in practice, his more usual references are to experience and reason alone as the guides to truth.¹⁵

In Browne's scientific method the eclecticism which characterizes all his work is again apparent. To put it simply, his use of

experience and reason associates him with the moderns; his use of authority, with the ancients. It is significant that he subordinates the latter to the two former. He thinks of himself as a modern. "There is nothing more acceptable to the Ingenious World," he had observed, "than this noble Elucation of Truth, wherein, against the tenacity of Prejudice and Prescription, this Century now prevaieth." ¹⁶ His use of experiment and of reason relates him to Bacon and to Descartes. In spite of their fundamental differences, both Bacon and Descartes were moderns, opposed to the scholastic tradition, ambitious to make man master of nature, and looking forward to a new order of knowledge. Browne's relation to them is symbolical rather than literal. They are the symbols of the two great modern schools of thought, the empirical and the rationalistic. In Browne, sensitive as he was to the intellectual climate of his day, we see the early stirrings of these two schools. He is probably not indebted directly to either philosopher. We have seen that in his analysis of the causes of error Browne was a Baconian rather than a direct imitator of Bacon. We shall see that to explain his use of experience and reason by ascribing it to Bacon and Descartes is again too simple. ¹⁷

In the very first aphorism of the *Novum Organum*, Bacon states that man "can do and understand so much and so much only as he has observed in fact or in thought of the course of nature; beyond this he neither knows anything nor can do anything." With this sentiment Browne is in complete agreement. For him the test of experience is the most important one of all. The "sense of man" is "the definitive confirmator and test of things uncertain"; "sense and Observation," he emphasizes, "seems to me the surest path, to trace the Labyrinth of truth." ¹⁸ As the great age of the new science, the seventeenth century saw the appearance of "philosophical instruments." Bacon had enjoined the use of devices to supply the shortcomings of sense and

to correct its deceptions. Browne was one of the first to make good use of "exquisite Microscopes." His scientific experiences—his random empiricism and his controlled experiments—are as diverse as his interests.

Browne's "doctrine of experiment" could have stemmed from Francis Bacon; it could also have stemmed from a long tradition antedating Bacon. William Harvey, Galileo, William Gilbert, and Vesalius, with the works of all of whom Browne was familiar, had before Bacon's time followed a tradition of revolt against authority, of observation of nature, and of co-operative research.¹⁹ Indeed, Aristotle himself could well have been Browne's preceptor, as he was Charles Darwin's, Aristotle, whom Browne describes as a "fellow Enquirer" of truth, with the moderns.²⁰ In the history of the inductive method, Aristotle's name precedes Bacon's. Actual observation formed the basis of all Aristotle's biological work, in obvious contrast to the direct intuition of Plato, who, as in the myth of the cave, denied that true knowledge could be based on observation by the senses. Not only in Bacon and Descartes, but in Aristotle and Plato, not to mention medieval and Renaissance authors, Browne could have found champions of experience and reason. The medieval tradition of experimental science has been amply documented.²¹ During the later middle ages Aristotelian logic served as the basis from which modern scientific method was developed. The center of this activity, moreover, was the school of Padua,²² at which Browne himself had studied. The traditionalism of the "determinators" of experience and reason is well attested by Alexander Ross, a traditionalist if ever there was one. In defending the ancient belief of spontaneous generation against Browne's skepticism, Ross remarks that "to question this is to question reason, sense, and experience."²³ The tradition of scientific observation and experiment was there long before Bacon's magnificent popu-

larization, a tradition with which Browne has many ties. In his use of experience, Browne is Baconian again only in the loosest sense.

When Browne designated reason as a guide to truth, he was following, not Descartes necessarily, but an old convention. Long after the Greek ideal of *nous*, *ratio* and *auctoritas* were the epistemological guides of the schoolmen, who sought by reason to confirm the doctrines based on authority. Indeed, it was as a revolt against medieval rationalism that the new science set up its new empirical ideal. But the intuitive reason of rationalistic tradition lingered on in the seventeenth century, was indeed vitalized in the modern rationalism of which Descartes is taken to be the first great representative. The new science did not substitute experience for reason; rather it added experience as another instrument, with reason, in the quest for truth. Even Bacon, in his division of knowledge according to the three faculties of the human soul, makes philosophy the product of reason, as are history of memory, and poetry of imagination. Boyle and Glanvill both use "reason" for the discovery of truth. Browne reflects both the rationalists' and the empiricists' use of "reason." It is often difficult, as a consequence, to determine his precise meaning for the term. Usually it refers to the exercise of the rational or "animal" faculty of the old psychology. As one of the three determinators of truth, it has three distinct applications: to the exercise of the rational faculty in logic, to the correction by the rational faculty of the errors of sense, and to Browne's own assumptions.

The exercise of the rational faculty in logic Browne describes quite clearly. Speech, he says, is at first an imitation of sounds; "men do speak in some kind but like Parrets, and as they are instructed, that is, in simple terms and words, expressing the open notions of things, which the second act of Reason compoundeth into propositions, and the last into Syllogism and Forms of ra-

tiocination." The applications of logic Browne has discussed in connection with fallacies, real and verbal. These fallacies—the literal interpretation of metaphors, false causal connections, arguments from false or partially false premises—he illustrates often in his discussions of vulgar errors. Thus verbal fallacies have given rise to the error that Jews stink, "upon the villany of that fact [the Crucifixion] which made them abominable and stink in the nostrils of all Men," and to the story of Romulus and Remus, the name of whose nurse was Lupa or "wolf." Fallacies of causal connection are illustrated in false inferences and false analogies, as that an ostrich digests iron because it swallows it ("which is an inference not to be admitted, as being a fallacy of the consequent, that is, concluding a position of the consequent from the position of the antecedent") and that all land animals resemble all sea animals, like the dogfish, sea horse, etc. ("Now if from a similitude in some, it be reasonable to infer a correspondence in all, we may draw this analogy of animals upon plants, and even upon minerals.")²⁴

The correction by the rational faculty of the errors of sense was the cure suggested for Browne's second cause of vulgar errors, the erroneous disposition of the people. This erroneous disposition arose from "a false judgment of things." The understanding of the vulgar "submitteth to the fallacies of sense, and is unable to rectify the Error of its sensations." And so they conceive that the earth is bigger than the sun and the stars smaller than the moon. Reason must correct experience. We must be careful here to distinguish the skepticism of Browne from that of Descartes. Though he is aware of the limitations of the senses, Browne does not reject their evidence in favor of the intuition of clear and distinct ideas. He regards sense and reason as closely allied; both together point the way to truth. "Joyn Sense unto Reason, and Experiment unto Speculation," he says, "and so give life unto Embryon Truths, and Verities yet in their

Chaos." He recognizes, though with some reservations, the dependence of the rational soul upon the human body, and hence of reason upon the senses. For the action of the soul, he says, there "is required not only a symmetry and proper disposition of Organs, but a Crasis and temper correspondent to its operators: yet is not this mass of flesh and visible structure the instrument and proper corps of the soul, but rather of Sense, and that the hand of Reason." ²⁶ When, therefore, Browne emphasizes the fallacies of sense, he is not necessarily following the Cartesian skepticism which rejects the senses as a guide to truth. The deceptiveness of the senses was recognized by empiricists as well as by rationalists. It is fundamental to Galileo's differentiation between primary and secondary qualities. It is clearly emphasized by Bacon. "But by far the greatest hindrance and aberration of the human understanding," says Bacon, "proceeds from the dulness, incompetency, and deceptions of the senses; in that things which strike the sense outweigh things which do not immediately strike it, though they be more important." Hence it is that "speculation commonly ceases where sight ceases; inso-much that of things invisible there is little or no observation." ²⁶ Robert Boyle is even more explicit in his reliance on reason as the ultimate criterion of truth. "Experience is but an assistant to reason," Boyle observes, "since it doth indeed supply information to the understanding, but the understanding still remains judge, and has the power or right to examine and make use of the testimonies that are presented to it." ²⁷ For Browne, too, sense is "the hand of Reason." Reason acts upon experimental data and arrives at a finer perception of truth than that furnished by the senses. Thus Browne remarks that "our clearest waters and such as seem simple unto sense, are much compounded unto reason"; this is experimentally shown when water is evaporated and found to contain a residue of salt, earth, and other materials. "The rationall discoveries of things transcends their simple de-

tections," as the discovery of the law of planetary motion is superior to that of the Indies and—as he had told Henry Power—Harvey's discovery was superior to that of Columbus's.²⁸

Browne's conception of reason differs, then, from that of Descartes on the crucial point of its relation to sense. He cannot follow through to Descartes' ideal of mathematical deduction from self-evident principles, proceeding from causes to effects, a deductive method apparent even in Descartes' work on physiology, *De L'Homme*. As with Bacon and Boyle, Browne's ideal method is inductive, proceeding from particulars. His application of reason for the correction, by the rational faculty, of the errors of sense reflects the empiricists' use of the term. Yet Browne is never eclectic. One other application of the term "reason" does ally him with the rationalistic philosophy and the deductive method which Bacon condemns in his *Idols of the Theatre*. It is the imposition of "reason," as synonymous with Browne's own a priori assumptions, upon his scientific material. Rather than to Descartes' "clear and distinct ideas," however, this application would seem more akin to Herbert of Cherbury's "common notions." "For reason being the very root of our natures, and the principles thereof common to all," Browne says, "what is against the Laws of true reason, or the unerring understanding of any one, if rightly apprehended, must be disclaimed by all Nations, and rejected even by mankind." Herbert's "common notions" and his criterion of truth as universal consent seem to be here reflected.²⁹

Whatever its source, this application of "reason," the test of truth by the deductive method, is most frequent in the *Pseudodoxia*. It is frequent because so often errors contradict what is for Browne the "reasonable" order of nature. One of his most fundamental assumptions, one related to the Greek concept of nous, is that the law of nature and the law of reason are identical, both being manifestations—the one in nature, the other in man

—of that Reason of God in which the whole creation participates.⁸⁰ To go against the natural order is, therefore, to go against reason and the will of God; it is to go against Browne's assumptions. Thus it is "repugnant unto Reason" that lampries should have nine eyes, because of "the monstrosity they fasten unto Nature," the superfluity of more than two eyes in one plane. Thus it "will not consist with reason" that the female viper in the act of generation should bite off the head of the male, an error "injurious to the providence of Nature, to ordain a way of production which should destroy the producer." And so generally any occult quality, one operating not by natural but by hidden causes, "contemns the law of Reason, and defends itself by admitting no reason at all."⁸¹ In all these cases the error is a special case which violates a general assumption, a "common principle," of Browne's, and so contradicts the law of reason.

The eclecticism so characteristic of Browne has been apparent in all these meanings and uses of "reason" in his scientific method. Browne does not cry from the housetops, as did Bacon, the liberating power of experience in opposition to the sterilizing influence of reason; nor does he guarantee, as did Descartes, the intuitive truth of reason as opposed to the falsity of the senses. Unlike either, he follows both sense experience and a priori reason in his quest for truth. He uses what comes to him from tradition and from contemporary science, often, perhaps, without too precise a formulation.

The doctrine of "authority" is the most ambiguous of Browne's guides to truth. Its ambiguity may in part be attributed to its historical career. It was certainly an established, not to say mandatory, principle with the schoolmen. The progress of the great Enlightenment is associated with its demise, at least in theory. By Browne's time it had come to play a minor part in the search for truth. On this account it occupies an anomalous position among Browne's three determinators. It is the only one he both attacks

and follows; it is the only one for which we must distinguish between his theory and his practice.

Authority was the target of Browne's heaviest attack in his analysis of the causes of error. Dependence upon authority is "the mortallest enemy unto Knowledge," involving a "resignation of our judgments." He points out the fallibility of the authorities themselves, evinced in their refutations of one another and in their credulity. Compared with reason and experience, authorities offer but "a weaker kind of proof," fit for immature minds. Upon intellectual maturity "we become emancipated from testimonial engagements, and are to erect upon the surer base of reason." If authorities are "neither consonant unto reason, nor correspondent unto experiment, their affirmations are to us no axioms." Browne's delight in displaying his opposition to authority is illustrated in two versions of his chapter "Of Snayles" in the *Pseudodoxia*, the later of which dramatically reverses his earlier opinion that snails have no eyes. He started the earlier version by contradicting authorities who held that snails do have eyes, and when he came round to the opposite opinion in the next edition, one would suppose he would then record his agreement with these same authorities. Instead, where the first edition states, "That Snayls have two eyes . . . is the opinion of some learned men," which he proceeds to contradict, the later edition states, "Whether Snayls have eyes some Learned men have doubted," which he again proceeds to contradict.¹²

Browne, however, does not always practice his precept of "omitting the authority of others, as the doctrine of Experiment hath informed us," or stand alone to meet "the Goliath and giant of Authority" with arguments "drawn from the scrip and slender stock of our selves." The *auctoritas* of scholastic and humanistic tradition still bound him. That is why the *Pseudodoxia* is like an encyclopedia of traditional learning. The authorities are used as often for purposes of confirmation as for those of confutation.

Often Browne gathers together all that they say on a particular question and lets that stand as evidence. Sometimes his dependence is explicitly stated. He is not above following an authority in the most scandalous beliefs, from which his scientific training should have protected him. Thus he believes in the magical cure by music of the bite of the tarantula, "since the learned Kircherus hath positively averred it, and set down the songs and tunes solemnly used for it."³³

Browne's dependence upon authority is often rationalized, as we should say. He equates its legitimacy sometimes with that of "reason" (as when he remarks it "were no injury to reason" to question the medicinal virtues of the unicorn's horn, since the "Ancients ascribed no such virtue to it"). More frequently he equates it with "experience"; the validity of an authority is that authority's experience. Concerning the error that the salamander is able to live in flames, he thus observes, "there is on the negative Authority and Experience." After listing a number of writers, he gives "experimental conviction": "Mathiolus observeth," he says, "a Salamander burnt in a very short time."³⁴ Browne's constant dependence upon such naturalists as Gesner, Aldrovandi, Belon, Rondelet, in addition to Aristotle, is best explained on this basis. Indeed the equation between authority and experience is for him usually a very just one; he is habitually checking one against the other.

It may be interesting to illustrate how Browne applies his threefold scientific method in the case of a particular error. His typical procedure in organizing a chapter of the *Pseudodoxia* is to state the error, to name authorities pro and con, to apply any or all of the three tests of truth, and to give the "grounds" of the error, sometimes rounding off with other lore on the subject. Let us take his chapter on the badger.³⁵ He finds the belief that the badger's legs are shorter on one side "repugnant unto the three Determinators of Truth, Authority, Sense and Reason."

Albertus Magnus speaks dubiously of its verity and Aldrovandus plainly affirms there can be no such inequality observed. In his own experience he could not discover this difference. The "affront to Reason" affords in this case the most extensive argument. It is an affront to one of Browne's cherished assumptions: such an inequality would be "generally repugnant unto the course of Nature." This course of nature he illustrates from Aristotle and from his own minute observation of geometrical proportions in animal locomotive organs. Authority and experience are here thus brought to the aid of reason. Lastly, he concludes, the monstrosity is ill-contrived, to affix two shorter legs on the same side: since quadrupeds move by cross legs, it would have been less absurd to make a pair of these shorter and thus preserve their equality. Thus by reading, observation, and thinking; by authority, experience, and reason, Browne attempted "the noble Eluctation of Truth," which he had held up as the whole duty of man. Not always is his organization so compact as in the chapter on the badger. But always he uses his determinators in an intellectual quest which has been routed to expose the pitfalls of human error. Browne's quest for truth, his prescription of scientific method, is complementary to his diagnosis of the diseases of the mind. His quest is speeded on the wings of a vigorous imagination, an imagination which is adumbrated in his science and crystallized, through its interaction with that science, in his philosophy and art.

3. *Body and Soul*

BROWNE WAS an uncommon physician and an uncommon scholar. His science was often enriched and sometimes encumbered by his universal learning. But it always provided the firm substructure for that learning. This substructure was the science of life. Browne's quest for truth penetrated farthest in the realm of biology. Within that realm, his constant concerns were with anatomy and physiology, structure and function, body and soul.

The relationship between structure and function seemed in Browne's day very obviously to be one between body and soul. For physiology was then still under the influence of Aristotle and Galen. The body was divided into three regions—lower, middle, and upper—according to the three "principal parts"—liver, heart, and brain. These regions were the seats of three faculties—the natural (generation and digestion), the vital (respiration and circulation), and the animal (sensation, judgment, imagination, memory, appetite, movement, understanding, and willing). These faculties all were functions of Aristotle's three souls: the natural and the vital faculties, of the vegetal soul; the animal faculty, of the sensible and rational souls.

All these bodily parts and faculties, from liver to brain, from generation to sensation, became Browne's preoccupation. Explicit, and more often implicit, in his pages is an astounding mass of material—a simple accretion, rather than an ordered synthesis—of theories and observations. Digestion is thus for him alternately a chemical and a mechanical process: resting upon the classical tradition of Aristotle and Galen, he describes it as "chilification by the process of natural heat," a process of cook-

ing or "concoction" in which food is turned into chyle by the natural heat of the body; following van Helmont and the iatrochemical school of his own day, he describes it as a process of fermentation, one resulting from "the vital acidity and fermental faculty of the Stomach"; following Giovanni Alfonso Borelli and the iatrophysical school, he describes it as a process of "commolition, grinding and compression" by the muscles of the stomach or by the stones he discovered in the gizzards of birds. His views on respiration exhibit a similar variety: his most confident opinion concerning the function of air is again that of the classical tradition—air is for "the contemperation and ventilation" of the fire of life; but respiration is also a process which somehow changes the blood from dark to light under the influence of a "nitrous Spirit" in the air, an ingredient Browne tested in his experiments on combustion and one similar to the "spiritus nitro-aerous" of John Mayow and the brilliant school of physiologists (Boyle, Robert Hooke, and Richard Lower) which in his day was undermining the classical doctrine.¹ This undisciplined variety in Browne's views on digestion and respiration is also a lively one. It illustrates how his anatomy and physiology supplied the channel for his amazingly sustained, enthusiastic scientific activity. Upon questions of structure and function, moreover, turned much of his work in natural history. Indeed, most of our information concerning Browne's anatomy and physiology is elicited from his discussions of plants and animals, with their scientific asides, in the *Pseudodoxia*. In that work particular animals are often associated with particular topics: the frog and the hare with generation, the chameleon and the ostrich with digestion, the elephant and the whale with anatomy. The persistence of Browne's interests, driving him to repeated observations of particular animals and to exhaustive reading on particular topics, is remarkable. His great imaginative works, his casual remarks in notebooks and letters, as well as the *Pseudodoxia* itself testify

overwhelmingly to the intensity and the continuity of Browne's interests in body and soul.

Because they bulk so large, these interests can, within the limits of this study, only be sampled. Our sample will be Browne's work on generation. This, the most ubiquitous subject in his writings, is paramount in his biology and hence in all his science. Moreover, of all Browne's scientific interests, this one carries most significance for his philosophy. We shall watch Browne as, equipped with all the learning of a learned climate, he comes to grips with his most important set of problems on body and soul.

Generation, says Browne, is the "great work whose wonders are only second unto those of the Creation, and a close apprehension of the one, might perhaps afford a glimmering light, and crepusculous glance of the other." ² The science of life in general and the dynamics of life in especial kindled Browne's imagination. Reflection upon change and growth furnishes a leitmotiv which runs through his scientific as well as his artistic writings. For such reflection the subject of generation provided profuse material. With the exception of the phenomenon of consciousness, no fact of life excites more interest than generation. As scientist, Aristotle had devoted himself to it; his contributions to embryology are greater in number than those of any other single embryologist. It is to Aristotle, through William Harvey and Fabricius ab Aquapendente, that Browne's line of descent runs.

The term "generation," as used in the seventeenth century, is less specialized than its modern analogue, "reproduction." It includes a wide variety of subjects, all having to do with biological causation and development. Browne thus speculated about the nature of the seed, of embryogeny, of heredity, and of sex; he studied plant seeds and animal eggs, semen, and embryos. For Browne, as for Aristotle, the theory of generation was tested and amplified by experience.

Among theoretical problems, one of the most involved was

that of the nature of the seed.³ Browne's concept of the seed is a complicated metaphysical one, its elements borrowed from many strands of tradition and its applications manifold. In the background of this concept lie the Platonic Idea, the Aristotelian causes, and various theories of generation—preformation, epigenesis, pangenesis, and panspermatism. His concept of the seed is involved with those of the origin of the individual, the origin of the species, and the nature of sexual and of spontaneous generation.

From the very start of his investigations, Browne was posed with the problem of preformation *vs.* epigenesis. This has probably been the dominant issue in the history of embryology. For Browne it is connected largely with plant embryology. Was the embryo preformed or postformed? Did it already exist in miniature in the seed, or did it unfold gradually? The advanced thinkers of Browne's day held to the former view. Browne's position in holding to the latter view, with Aristotle and with Harvey, was conservative.

The issue between these two theories is joined for Browne in his correspondence with Henry Power. Power had seized upon a phrase in *The Garden of Cyrus* where Browne was discussing the first signs of sprouting, "the rudimental spring of seeds," and where he had noted, "how little is required unto effectual generation, and in what diminutives the plastick principle lodgeth." Browne was arguing that the greatest part of the seed served for food, the "little nebbe or fructifying principle" occupying a comparatively tiny space. It was this "little nebbe" that fascinated Power, who in a letter to Browne proceeded to develop his preformationist views on the subject. Browne's epigenetic "principle" in seeds puzzles him: "But wt you meane by the plastick principle lodging in these diminutive particles, I doe not well understand. I am farre more prone to beleeeve that these fructifying particles or Atomes, (be they never so minute). are indeed the

whole plant perfectly there epitomized." Power believes in preformation. Embryonic development is for him a simple growth of a complete miniature organism, rather than a progressive development of new parts. The miniature plant is enclosed in "severall films, huskes & shells." This, Power claims, is "Autopically demonstrable," especially in larger seeds like those of ash, where "the skins being removed & the kernall cleft lengthways in the midle you shall find a youngling Ash." And so likewise, he suggests, the sperm of animals may be seen to contain miniature individuals. Evidently what Power saw were partially developed embryos in already fertilized ova, not primitive "Atomes." Upon such misreading of evidence the preformation doctrine flourished. For skeptical observers Power had a ready answer: "In vaine, therefore, may wee expect an ocular demonstration of these things, unlesse we had such glasses (as some rant of) whereby they could see the transpiration of plants & Animals, yea the very magneticall effluvioms of the Loadstone." ⁴ Here, where Power assumes what he is trying to prove, we can foreshadow the whole amazing history of the preformation doctrine, the case history of an observable phenomenon which is hotly debated rather than closely observed.

The first "evidence" to establish the doctrine of preformation came from Jan Swammerdam in 1669. Swammerdam had seen the butterfly folded up and perfectly formed in the cocoon. He had concluded that the butterfly had been hidden or masked in the caterpillar, which in its turn had been hidden in the egg. Thus, butterflies contain eggs and eggs contain butterflies. When Antony van Leeuwenhoek discovered the spermatozoa in male semen, a great impetus was given to the more refined theory of animalculism: the semen—not the egg—contained, in its "little animals," the preformed fetus. However, whether the miniature resided in the egg or in the semen made little difference; essentially, for all preformationists, there could be no new genera-

tion, only growth. Applied to man, preformation explained even original sin, "for all men were contained in the organs of Adam and Eve." ⁶ Thus was the preformation doctrine elaborated into that of encasement or *emboîtement*. The conception of an endless series of embryos, each of which was encasing and encased, like a nest of boxes, was first developed in detail by Nicolas Malebranche in 1674. By the eighteenth century, preformation had become the reigning scientific explanation of embryogeny. It was a versatile theory, popular with churchmen and philosophers. The theological argument in its favor was well brought out in the controversy between John Locke and Bishop Stillingfleet. The Bishop supported preformation because it was implied by the Christian doctrine of special creation and the resurrection of the *same* body. Individuals were thus specifically created in the beginning and retained their identity even into the next world, through the resurrection of their same body. The preformation doctrine also accorded with the belief that nature operated automatically. God produced all the germs at the creation; subsequently, nature only stimulated the growth of these latent organisms. These philosophical affinities with both the Christian and the deistic world views may help explain the growing popularity of the preformation doctrine in Browne's day. It was championed by such men as Descartes, Marcello Malpighi, John Ray, Albrecht von Haller, Jan Swammerdam, Leeuwenhoek, and Leibnitz.

The essential conservatism of Browne's position in harking back to the Aristotelian doctrine of epigenesis, as opposed to the fashionable doctrine supported by so many scientists and philosophers, may now be apparent. Not that Browne takes an unequivocal stand. He rarely does that. In response to Henry Power's long letter on preformation Browne replied that although it is not easy to demonstrate before the seed has begun to germinate, "yet it is not improbable that the plant is delineated

from the beginning.”⁶ Browne, as always, is cautious, but, as always, tempted. He notes that Power’s and his own observations have been of seeds that already have had a chance to develop, and he is characteristically thorough in his examination of Power’s claim: What about the other parts of the plant, besides the leaves and stalk which Power said he saw? After all, a plant organism consists of more than these two parts. Should not all of it be visible in a completely preformed miniature? Do these invisible parts have only an Aristotelian potentiality, and, hence, develop according to the opposing theory of epigenesis, while the visible leaves and stalk alone are actual and preformed? But Browne’s restless mind is also intrigued by the implications of preformation. What is the relationship between it and spontaneous generation? He tells how he “narrowlie watched” for the emergence from water of the “first vegetable Atome” of duckweed, in which atom, spontaneously produced, he thought he did detect a delineation of the plant.⁷ He also wonders, if preformation has any show of truth, what about plants which generate vegetatively, not from seeds but from pieces of cut root? Will these pieces of root also contain a preformed plant? Browne’s scientific imagination is as excited by the subject of generation as his artistic imagination is by that of antiquities.

In contrast to the doctrine of preformation, that of epigenesis derives the embryo from a homogeneous seed by a gradual process of differentiation and growth. There is no original creation of all the individuals of a species; each birth involves a new creation. The question of the origin of the embryo still, of course, remains. Aristotle and Harvey had tried to answer this question, and Browne tended to follow along the lines they had marked out. In doing so, he was among a conservative minority, on the side of the ancients. It is only an irony of history that he was nearer the truth, as understood after his day, than were the moderns of his own day.⁸

Whereas the preformationists explained the origin of the embryo by a materialistic and graphic theory, the epigenesists had to rely upon a spiritual principle. It was a difference between the actual and the potential. Epigenesis implies that development is an epiphenomenon, that the motive force is a mysterious, vital agent, whose action cannot be explained in terms of chemistry and physics. Aristotle had talked about an efficient cause, Harvey about a "First cause," a "Generative Principle," a "primordium vegetale" or vegetal principle. The doctrine which entered into this concept is that of seminism: the generative principle resides in the male or female semen. This principle reappears under a variety of names in the history of the theory of generation. Besides the efficient cause of Aristotle and the "Generative Principle" of Harvey, there are the "Vis Essentialis" of Christian von Wolff, the "Nisus Formativus" of Johann Friedrich Blumenbach, the "Vis Plastica" of Buffon, the "Mystical Host," "Psychic or Ingenerate Heat," "Anima Vegetativa," "Vis Enthæa," and the "Vital Force" of modern philosophy. Browne's most common name to signify this principle is "Idea." To take but one instance, when in *The Garden of Cyrus* he is discussing darkness and light, he comes to the subject of seeds, which, he says, "do lie in perpetual shades" inside their shells: "Legions of seminal *Ideas* lie in their second Chaos and Orcus of Hippocrates; till putting on the habits of their forms, they show themselves upon the stage of the world, and open dominion of Jove." ⁹ The terms "Ideas" and "forms" indicate the ultimate source of Browne's conception—Greek philosophy. Harvey, whose "primordium vegetale" lives potentially as the origin of the egg, which in turn is the origin of every animal,¹⁰ is indebted to the same source. Harvey, moreover, had spent quite some time analyzing Aristotle's efficient cause. In order, then, to understand Browne's conception of the Idea in the seed, we must examine the theories of generation of his two great predecessors, Aristotle and Harvey.

Aristotle considered the possibilities of preformation and of epigenesis: "Either all the parts, as heart, lung, liver, eye, and all the rest, come into being together or in succession. . . ." ¹¹ In resolving these alternatives, he was scientist enough not to go beyond the evidence and postulate a preformation he could not see: "That the former is not the fact is plain even to the senses, for some of the parts are clearly visible while others are not; that it is not because of their being too small that they are not visible is clear, for the lung is of a greater size than the heart, and yet appears later than the heart in the original development." Thus long before its birth, he killed the argument upon which Power and other preformationists depended—that the miniature embryo was there all the time, but was too small to be seen, except perhaps by powerful magnifying glasses, which they unfortunately did not possess. With the point established that development proceeded by succession of parts, the question arose, what is the nature of that succession and how is each part formed? As for the succession, since one organ is earlier and another later, does one make the other or does one only appear after the other? Aristotle accepted the latter as true, for "in all the productions of Nature or of art, what already exists potentially is brought into being only by what exists actually; therefore if one organ formed another, the form and the character of the later organ would have to exist in the earlier, *e.g.*, the form of the liver in the heart." The relation of the parts to one another is temporal rather than causal. As to the cause of the development of the embryo, that Aristotle found in the male semen. This semen contributes the form and the moving principle.¹² The material out of which the embryo is formed is supplied by the female catamenia or menstrual blood. In this material, the parts of the embryo already exist potentially. The moving principle of the male semen causes these parts to "develop in a chain one after another, as the wheels are moved by one another, in the auto-

matic machines." As a carpenter shapes wood with his tools, so does the semen impart form to the catamenia. The male semen also imparts the sensitive soul to the catamenia.¹³

The fundamental problem, the *reason* for the gradual display of parts, presented itself in a somewhat different way to Harvey than it did to Aristotle. Aristotle found his generative principle in the male contribution; Harvey, rejecting Aristotle's prejudiced assignment of sex roles, found his principle in the total *product* of male and female contributions, the egg. *Ex ovo omnia* is Harvey's famous dictum. But what he means by "egg" is vague. The egg is both the source and the goal of life, "the terminus from which all fowls, male and female, have sprung, and to which all their lives tend—it is the product which nature has proposed to herself in their being." The egg is a portion of eternity; in it the species endures forever. Harvey extended this concept to include not only the eggs of birds, but the seeds of plants, the conceptions (blastodermic vesicles) of mammals, and the larvae and pupae of insects. Such substances of course differ morphologically from one another, and Harvey was consequently driven to find a common factor. He found it in an abstract principle—a "primordium vegetale" or "vegetative incipency."¹⁴ This principle lives potentially as the origin of the egg, which in turn is the origin of every animal. For Harvey the egg was essentially an a priori concept, not an observed fact.

The two factors which both Aristotle and Harvey agree upon as necessary for embryonic development, a *potential* individual and a moving principle to turn this potentiality into an actuality, are the epigenetic counterbalance to the preformationists' miniature individual. These two factors help explain Browne's "Idea," whose locus is the "seed," a Harveian product of male and female.¹⁵ Browne uses the term "Idea" usually to indicate the potential individual in the seed and the term "form" to indicate the moving principle. But the two are associated together by

him and nowhere clearly distinguished; they tend indeed to become identified.

Browne's Idea, the potential individual, is immutable and eternal, the type or "Exemplar" of which the actual individual is a copy. This aspect it is which probably determined Browne's choice of the term "Idea." Browne's Idea is both a potential individual and a Platonic reality. "In the seed of a Plant, to the eyes of God and to the understanding of man, there exists, though in an invisible way, the perfect leaves, flowers and fruit thereof; for things that are *in posse* to the sense, are actually existent to the understanding." The invisible Platonic reality in this statement contrasts markedly to the material actuality of the preformationists' seed. This epigenetic point of view is more congenial to Browne's whole outlook, in the light especially of the *Religio Medici*, which flows so deeply in the Christian Neoplatonic tradition. Both potentiality and Platonic reality characterize the "Legions of seminal Ideas" which have yet to put on "the habits of their forms," and so show themselves upon the stage of the world. With his ready whimsicality, Browne finds quaint application for his concept—in Adam's rib. That too must have contained an Idea—of Eve; and so Eve's generation, though not quite normal, accorded with the fundamental law of epigenesis: "there was a seminality and contracted Adam in the rib, which by the information of a soul, was individuated into Eve." ¹⁶ Here to interpret the "contracted Adam" as a preformed Adam would of course be ludicrous, as the event proved.

For epigenetic development, a moving principle is necessary as well as an immutable reality. That the Idea is also dynamic, that it contains the efficient cause of Aristotle's "semen" and of Harvey's "primordium" is evident in its association with a "formative operator." In discussing why mutilations are not transmitted from father to son, Browne stresses the "power" which the seed possesses, and he equates this power with that of the Idea.

If the seed can produce twins, certainly it can make good any missing parts of the parents: "Parts of the seed do seem to contain the Idea and power of the whole." The Idea is the potential individual and also the agent, the "plastick principle," which produces the individual. With this in mind Browne changes over to Aristotelian terminology in his discussion of mutilations: "for though the seminal materials disperse and separate in the matrix, the formative operator will not delineate a part, but endeavor the formation of the whole; effecting the same as far as matter will permit, and from divided materials attempt entire formations." ¹⁷ The Idea is equivalent to the formative operator, and has such power, indeed, that it may produce not only missing parts and twins: "And therefore, though wondrous strange, it may not be impossible . . . what Albertus reports of the birth of an hundred and fifty." ¹⁸

The action of the Idea or formative operator, the formation of the embryo in the womb, Browne calls "the strangest Artifice in all the acts of Nature." Its strangeness is magnified for him from his viewpoint of epigenesis. A common objection to epigenesis was that it involved a new act of creation with each new individual. The *emboîtement* theory of the preformationists more expeditiously comprehended all generation in the original act of creation, multitudinous miniatures of mankind being encased within our first parents. This objection Browne turns into an asset. Each new birth is the product of a new creation only less wonderful than the first great one. To be able to behold the development of the embryo, he remarks, "were a spectacle almost worth one's being, a sight beyond all; except that Man had been created first, and might have seen the show of five days after." The miracle lies in the operation of the Idea, "the inward Phidias," and the gradual display of parts, "wherein the plastick or formative faculty, from matter appearing Homogeneous, and of a similary substance, erecteth Bones, Membranes, Veins, and Arteries: and

out of these contriveth every part in number, place, and figure, according to the law of its species," the miracle of animals "who entering the Womb in bare and simple Materials, return with distinction of parts, and the perfect breath of life." Hence the vulgar error which credits the formation of the bear cub to the licking of the dam vilifies the works of God, ascribing to the tongue of a beast the miracle of a creation.¹⁹

Browne's Idea, like so many of his concepts, is eclectic. It is real in a Platonic, and causal in an Aristotelian sense (being a material cause as the unformed matter of the seed, a formal cause which "delineates" that matter, an efficient cause for embryonic development, and a final cause, or potential individual). It shows some resemblance to the "seminal reason," the *logoi spermatikoi*, of the Stoic and Neoplatonic traditions. It also enters Browne's Christian doctrine, becoming identified with the human soul. Browne's epigenetic theory is thus in harmony with his general Aristotelian, Neoplatonic, and Christian outlook. The crucial difference between preformation and epigenesis was one between the actual and the potential, the material body and the invisible principle. By means of his concept of the epigenetic Idea in the seed, Browne, as will be seen later, could turn his philosophy into divinity.

Browne's concept of the Idea has some interesting applications—in his views on heredity, on variation in the individual, and on variation in the species. Of these we shall here consider only the first.²⁰

Browne's conception of heredity is nowhere fully developed, though from hints he has let drop, he apparently gave some thought to the subject. As far as it can be reconstructed, his view here is of a kind with his view on embryology. Browne adopts a modified form of pangenesis, a theory which is complementary to that of epigenesis. Epigenesis explains the development of the embryo from the fertilized egg; pangenesis explains the

origin of the egg itself. Pangenesis is one of the oldest theories of generation. According to it, representative particles are contributed from all parts of the body to the generative secretions, which secretions, upon mingling, give rise to similar parts in the offspring. Thus is heredity explained, the resemblance of the offspring to its parents. Such a theory was discussed by Hippocrates and Aristotle, by Browne's contemporaries Nathaniel Highmore and Sir Kenelm Digby, and later by Pierre Maupertuis, Buffon, and Charles Darwin, to the last of whom the name is due.

The versions of Browne's contemporaries are significant for us, since Browne read both Digby and Highmore. Digby's interpretation is rough. He says that the living creature is produced by the superfluous nourishment which proceeds from all parts of the body; these substances are assembled according to the disposition of the bodily parts in the parent. A cat whose tail had been cut off, in his illustration, produced kittens half of which had no tails. Digby does admit that he cannot conceive the mechanism by which particles are collected from outlying parts of the body. Highmore's work, an answer to that of Digby, is one of the earliest in modern times to develop a reasoned theory of pangenesis. His version is atomistic. The genital glands collect from the blood atoms corresponding to every part of the body; these atoms undergo "digestion" in the gonad and are concentrated into the germ, which thus represents the substance of the whole parental body.²¹

Browne's theory is interesting, though from the few scattered hints he has let drop, vague. He talks of "parts of the body" and "parts of the seed"; it is unclear whether he thinks of the latter as particles (or atoms) as Highmore thought of them. Also with Browne the theory of pangenesis is modified to include the Idea. The seed carries with it not a simple material substance representing every part, but also "the Idea of every part." The Idea,

the *potential* individual, exists within the parts which materially represent the individual. The "parts of the seed" are like mirrors reflecting the Idea of the whole individual and are at the same time a physical contribution of the parent, representative of his material "parts." Browne's theory bears the imprint of the Platonic tradition. The parts in the seed are monads, both corporeal and spiritual in nature. It is so in the seed because it was so in the parent. Browne's concept of the human body is analogous to his vitalistic concept of the seed which issues directly from all parts of that body. The human body is composed of parts, each of which is, like the seed, a combination of matter and Idea: "For in every part from whence the seed doth flow, there be contained the Idea of the whole." And so it follows that the rib of Adam contained the Idea of Eve: "there was a seminality and contracted Adam in the rib, which by the information of a soul, was individuated into Eve." Thus Browne's theory of heredity explains the origin of the Idea in the seed, which Idea was so important for an understanding of his concept of embryonic development. Browne goes even a little further. The parts of the body which send representative materials to the seed may contain very powerful Ideas, so powerful that not one but two or more potential individuals may be contained in them. Thus are twins born: "For the seed conveyeth with it not only the extract and single Idea of every part, whereby it transmits their perfections or infirmities; but double and over again; whereby sometimes it multipliciously delineates the same, as in Twins, in mixed and numerous generations."²²

It is most interesting to note that Browne's scientific imagination has blended two very different views on heredity. The operation of the Idea was quite Aristotelian in character; that of pangenesis, an essentially physical view, was clearly not so. One of Aristotle's arguments against pangenesis was that normal offspring are born of mutilated parents,²³ the inference being that

the mutilated parts did not contribute a representative particle to the seed—contrary, for example, to the specious evidence of Digby's tailless cats descended from a tailless parent. For Browne heredity may be pangenetic and at the same time—due to the power of the Idea—may result in normal offspring from mutilated parents. For the Idea, even of a mutilated part, is one of a *whole*, of a perfect individual. Hence it is, he says, that posterity has not inherited one less rib from Adam.

Parts of the seed do seem to contain the Idea and power of the whole; so parents deprived of hands, beget manual issues, and the defect of those parts is supplied by the Idea of others. . . . And thus may be made out the cause of multiparous productions; for though the seminal materials disperse and separate in the matrix, the formative operator will not delineate a part, but endeavor the formation of the whole; effecting the same as far as matter will permit, and from divided materials attempt entire formations.

However, Browne does not concentrate only on the Idea. His genetics is no less material than psychical. This is implied when we say the transmission is by pangenesis. Thus he explains how the blackness of the negro is transmitted as one particle among the others which will determine his organism: "it is evidently maintained by generation, and by the tincture of the skin as a spermat-ical part traduced from father unto Son." Browne himself stresses this important point—the relationship between matter and spirit in the seed. In generation "a transmission is made materially from some parts, with the Idea of every one; and the propagation of one, is in a strict acception, some minoration of another." That is, the parent loses a physical part of himself in the process of descent. We have already seen how Browne regarded the seed as a spiritual substance, and we shall soon see how he studied it as a material one. Browne's theory of pangenesis maintains, in

addition, that this substance is an inheritance from all the parts of the parent's body, which parts will unite and grow into a new individual, a new link between matter and spirit in the great chain of being, into a new microcosm like the parent.²⁴

Metaphysical thoughts on biological causation were for Browne, as for Aristotle and Harvey, grounded on physical evidence. Eagerly he probed all generative materials—the seed, the egg, the semen. In the plant seed he sought the precise location of the Idea, of the “plastic principle.” He was amazed at what little space this growing-point, or “neb” occupied—“in what diminutives the plastic principle lodgeth”—noting that the great bulk of the seed served for protection and nutrition. To test the self-sufficiency of the neb, he cut away the greater part of the seed of various plants and found that the remainder nevertheless grew into a plant. Especially did he try to catch the seed in the very act of sprouting. He had isolated the plastic principle; now, how did it work? Here he might triumph over a secret wrung from nature's close reserve: “He that would discern the rudimentall streak of a plant may behold it in the Originall of Duckweed, at the bignesse of a pin's point, from convenient water in glasses. . . .” Here was the specific case which brought to a head his general interest in generation; here was the original stroke of life. His supple mind attacked this crucial problem from all angles: Exactly in what part of the seed did growth start? When growth started, which came first, the root or the leaf? Which part of the seed produced the root and which the leaf? Could the part that produced the root be made to produce the leaf and vice versa? To most of these questions he found answers, and then, characteristically, he added a list of unanswered questions, a list which reveals his boundless curiosity:

Now whether seminall nebbes hold any sure proportion unto seminall enclosures, why the forme of the germe doth not

answer the figure of the enclosing pulp, why the nebbe is seated upon the solid, and not the channel'd side of the seed as in grains, why since we often meet with two yolks in one shell, and sometimes one Egge within another, we do not oftener meet with two nebbes in one distinct seed. . . . Whether it be not more rational Epicurism to contrive whole dishes out of the nebbes and spirited particles of plants, then from Gallatures and treddles of Egges, since that part is found to hold no seminall share in Oval Generation, are Quaeries which might enlarge, but must conclude this digression.²⁵

In his animal studies many of these questions centered in what he called "the doctrine of eggs." The origin of the chick in the egg was one of the great mysteries for the early embryologist. What part of the egg provided the formative material and what part the nutritive? This question was debated from the time of Hippocrates to that of Harvey. Four parts of the egg were considered: the yolk, the white, the chalazae (spiral bands in the white of the bird's egg, at either end, holding the yolk in place), and the cicatrice (a small disc of protoplasm in the yolk). Each of these possibilities Browne considered.²⁶ His eager mind probed even further. Not only the structure, but the chemistry of eggs fascinated him. He was indeed the first to experiment in the field of chemical embryology. "How far the coagulating principle operateth in generation," how odors and colors might be infused in eggs, such chemical questions intrigued him. These interests are quaintly represented in a letter written one late December day a few years before his death. "Have a care of yourself in this cold weather"; he says to his son, Edward, "wee are all in snowe, & tis now a proper time to freez eyes, or eggs, or the galls of animals with salt & snowe. . . ." The only conclusion that can be drawn from Browne's copious notes on eggs, one historian of embryology declares, "is that it was in the laboratory of Sir Thomas' house at Norwich that the first experiments in chemical

embryology were undertaken. His significance in this connection has so far been quite overlooked." ²⁷

The egg was Harvey's counterblast to Aristotle, who had sanctioned from metaphysical heights the tradition of male superiority. The male semen, said Aristotle, contained the efficient cause, was purer and diviner than the female catamenia; the contribution of the female lacked the principle of soul. Browne, like Harvey, rejects this invidious distinction; indeed he calls it a perpetuation of Satan to disparage the fruit of the Virgin. But he shares Aristotle's curiosity about the semen, and most of Aristotle's answers. Semen is for him, as man is for him, both matter and spirit. Discussing the effect of the loss of semen on the health and life-expectancy of animals, Browne first dismisses the idea, elaborated by Fabricius, that semen is only spirit, which influences the egg by a kind of irradiation. Instead of irradiation, Browne offers a more Aristotelian theory: "For the generation of bodies is not merely effected as some conceive, of souls, that is, by Irradiation, or answerably unto the propagation of light, without its proper diminution: but therein a transmission is made materially from some parts, with the Idea of every one and the propagation of one, is in a strict acception, some minoration of another." Like Aristotle, Browne is concerned with the physical nature of semen, especially its color. The color of semen, said Aristotle, is white because it is mixed with spirit and because it is a foam. Even the ancients noticed that semen was of the nature of foam, Aristotle continued, and hence the goddess of love, Aphrodite was foam-born! In a passage that caught Browne's imagination, Aristotle noted that "Herodotus does not report the truth when he says that the semen of the Aethiopians is black, as if everything must needs be black in those who have a black skin, and that too when he saw their teeth were white." Now the blackness of negroes was for Browne a fascinating subject, and he too speculated how a black skin could be derived from a white seed. He agrees with

Aristotle's assertion against Herodotus, and goes further than Aristotle in trying to explain how, then, the blackness ensues, arriving at the neat hypothesis that the semen of negroes is white in appearance only, but contains within itself a duskiness: "being first and in its naturals white, but upon separation of parts, accidents before invisible become apparent, there arising a shadow or dark efflorescence in the outside; whereby not only their legitimate and timely births, but their abortions are also dusky, before they have felt the scorch and fervor of the Sun." ²⁸

All along we have been concerned with sexual generation, whether viviparous, oviparous, or vermiparous. For Browne sexual was distinguished from spontaneous generation, "univocal" from "equivocal." The significance of the Idea is especially pointed by this distinction. The Idea is the governing principle of sexual generation, of Browne's theories of embryogeny and heredity, epigenesis and pangenesis. It is the absence of the Idea which characterizes spontaneous generation. "Imperfect" animals do not resemble their parents, because they lack the Idea which determines heredity and development. On this basis Browne is able to criticize the vulgar error on the birth of the phoenix: the phoenix is a bird, hence oviparous and sexually generated; it cannot as such proceed from a worm which has been spontaneously generated from the dead body of the parent. "For hereby they confound the generation of perfect animals with imperfect, sanguineous with exanguineous, vermiparous with oviparous, and erect Anomalies, disturbing the laws of Nature." Even the vermiparous generation of insects, and their succeeding metamorphosis from larva to imago is sexual or univocal because the Idea of the future adult has been inherited by the larva; this Idea determines the insect's course of development: "yet proceeds not this generation from a corruption of themselves, but rather a specifical and seminal diffusion, retaining still

the Idea of themselves, though it act that part a while in other shapes." On the other hand in "generations equivocal, and such as are not begotten from Parents like themselves," the family relationship is lacking because the Idea is lacking. That is why, Browne wittily observes, "The problem might be spared, Why we love not our lice as well as our children." If we forget the importance of the Idea, Browne warns, we blur the fundamental distinction. And his imagination is aroused by the possibilities, especially in connection with death. Death and corruption would then be not the end but the beginning of life. "Noah's Ark had been needless, the graves of Animals would be the fruitfullst wombs; for death would not destroy, but empeople the world again." ²⁰

This belief in spontaneous generation is an old and still accepted one, long antedating Aristotle, to whom it is often ascribed. It is possible that life once did arise spontaneously from nonliving matter; our version of the older theory is today called "abiogenesis." We need only recall recent experiments on unfilterable viruses as evidence of our uncertainty on this question. Aristotle put the matter succinctly when he remarked that "nature passes from lifeless objects to animals in such unbroken sequence, interposing between them beings which live and yet are not animals, that scarcely any difference seems to exist between two neighboring groups because of their close proximity." Lucretius incorporated the belief into his system; Pliny of course stood by it; Virgil talked about the generation of bees from oxen in the *Fourth Georgic*; Milton talked of beasts springing from the earth. Indeed, the grosser versions of the belief were not finally quashed till Pasteur in 1861 demonstrated that what appears like spontaneous generation arises really from "germs" suspended in the air, although Francesco Redi had first undermined the belief in Browne's day, back in 1668, by the admirable ex-

periment in which he covered decaying substances with gauze thus preventing the deposit of worms' eggs and the consequent generation of worms in these substances. The strength of the belief in the seventeenth century is almost ludicrously attested by Alexander Ross. At the conclusion of his book on animals in the *Pseudodoxia*, a book full of avowals of his belief in spontaneous generation, Browne had mildly questioned one of the more extravagant claims of the school of Paracelsus, whereupon the ultraconservative Ross attacked the conservative Dr. Browne:

He doubts *whether mice can be procreated of putrifaction*. So he may doubt whether in cheese and timber worms are generated; Or if butterflies, locusts, grasshoppers, sel-fish, snails, eels, and such like be procreated of putrified matter. . . . To question this is to question Reason, Sense, and Experience: If he doubts this, let him go to Aegypt, and there he will find the fields swarming with mice begot of the mud of *Nylus*, to the great calamity of the inhabitants. What will he say to those rats and mice, or little beasts resembling mice, found generated in the belly of a woman dissected after her death. . . . A toad hath been found in a piece of sound Timber.³⁰

Putrefaction, it has been evident, was one of the most commonly assigned causes of spontaneous generation, so commonly that the latter was often identified simply as "putrefactive generation." Fabricius opens his treatise, "The Formation of the Egg and of the Chick," by stating that animals arise from eggs, from semen, or from putrid matter. Paracelsus made putrefaction the controlling principle in all generation. Moisture and heat, he said, "constitute the first grade and beginning of putrefaction, which procreates all things as a hen procreates her eggs." Upon putrefaction Paracelsus based his "miracles" of artificial generation, such as that of the chick burnt to powder, then converted to

a putrid phelgm, which, when enclosed in the original shell, would turn into another chick.³¹

Browne firmly believes in such generation from putrefying substances, usually bodily secretions, or "humours"—"even as in the body of men from putrid humours, and peculiar ways of corruption; there have succeeded strange and unseconded shapes of worms; whereof we have beheld some our selves, and read of others in medical observations." The worms are "unseconded" because the course of spontaneous generation is irregular and unpredictable, no two generations being the same—in contrast to sexual generation, where the governing Idea insures regular resemblances between parents and offspring. Thus Browne questions "Whether that common opinion that Snakes do breed out of the back or spinal marrow of man, doth build upon any constant root or seed in nature," where his doubt concerns not the fact of such generation, but its regularity and predictability. Creatures which are bred from putrefaction are usually venomous, as Paracelsus had remarked: serpents, toads, frogs, spiders, bees, ants, and worms. In fact, Browne makes the degree of venom a measure of the degree of corruption. The kinds of insects produced in the spring truly declare

the corruptive constitution in the present sap and nutrimental juice of the Tree and may consequently discover the disposition of the year, according to the plenty or kinds of these productions. For if the putrifying juices of bodies bring forth plenty of Flies and Maggots, they give testimony of common corruption, and declare that the Elements are full of seeds of putrifaction, as the great number of Catterpillars, Gnats, and ordinary Insects do also declare. If they run into Spiders, they give signs of higher putrifaction, as plenty of Vipers and Scorpions are confessed to do; the putrifying Materials producing Animals of higher mischiefs, according to the advance and higher strain of corruption.³²

Other causes of spontaneous generation were believed to be heat and moisture, which causes we noticed Paracelsus posited as conditions for the vital properties of putrefaction. Aristotle had been very careful to dissociate putrefaction from these other two causes. He noted that spontaneous generation occurred in connection with putrefaction as well as with heat and moisture; however, "Nothing comes into being by putrefying, but by concocting; putrefaction . . . is only a residue of that which is concocted." This biochemical "concoction" of nonliving into living matter occurs in the presence of water (which contains some breath of life, *pneuma*) and of vital heat. Matter concocted under these influences arises in a frothy bubble, which issues in more or less "honorable" kinds of life, depending on the nature of the original matter. Thus it was that Lucretius could later speak of "many creatures . . . springing out of the earth, taking form by the rain and heat of the sun."³³

For Browne water and sunlight are not exclusive but, with putrefaction, contributing causes of spontaneous generation. He speaks of locusts bred out of "spumous, frothy dew or exudation, found upon plants." His experiments convinced him of the production of duckweed and snails from water; in fact, he believed that "most insects owe their originall thereto, most being made of dewes, froaths, or water." The vital power of the sun is illustrated in Browne's explanation of Satan's apparent miracle to confound Moses by turning dust to lice: "An act Philosophy can scarce deny to be above the power of Nature, nor upon a requisite disposition beyond the efficacy of the Sun." Here is the imprint of Browne's vitalism, his belief that all matter contains a vital principle, which will eventuate in living creatures when external conditions are favorable. The sun is one of the determining factors for such eventuation. Hence spontaneous generation is an easy and natural process for Browne. Conditions are usually favorable; water is "the principle of all things"

and the sun is everywhere. "Imperfect" creatures thus spring up in abundance, such, "as were not preserved in the Ark, but, having their Seeds and Principles in the womb of Nature, are everywhere, where the power of the Sun is. . . ." This fertility of nature and vitalizing power of the sun stirred Browne's imagination; it inspired one of the most brilliant passages in the *Religio Medici*, one followed by a poetical outburst on the "quickenings beams" of God's spirit. He is sure "there is a common Spirit that plays within us, yet makes no part of us; and that is, the Spirit of God, the fire and scintillation of that noble and mighty Essence, which is the life and radical heat of Spirits. . . . This is that gentle heat that brooded on the waters, and in six days hatched the World. . . . Whosoever feels not the warm gale and gentle ventilation of this Spirit, though I feel his pulse, I dare not say he lives. . . ." ³⁴

Spontaneous generation, as understood by Browne, is, then, a manifestation of vitalism; it is a biological corollary of his animism, of his favorite concept of the constitution of matter. Browne's vitalism and its Aristotelian background have been amply illustrated in his theories of sexual generation, those on the nature of the seed, of male semen, of heredity, and of embryonic development. A distinction must be made between Browne's *Idea*, which is the express feature of these theories, and the *seminal principle* in matter which causes spontaneous generation. The seminal principle is less defined; it is the "common nature" of all living things, an aspect of the "universal and common Spirit to the whole World." ³⁵ Robert Fludd thus used spontaneous generation to prove the existence of the universal soul; Aristotle had explained it on the basis of the soul which all things possess. This seminal principle underlies not only spontaneous generation but another vitalistic concept related to it, that of "panspermatism." According to this theory, credited to Anaxagoras, generation depends upon a primordial substance

endowed with life, which substance was scattered abroad in the form of particles at the creation. These particles cause generation by entering the ovaries and testes of living organisms. When these organisms die, they undergo disruption and the particles return to their original state, ready to enter new organisms. This theory was elaborated to explain fecundation—by the entrance of these particles into the ovaries from food—but such fantasies are outside Browne's consideration.

Browne is, however, much concerned with the omnipresent and eternal generative particles:

For the hand of God that first created the earth, hath with variety disposed the principles of all things; wisely contriving them in their proper seminaries, and where they best maintain the intention of their species: whereof if they have not a concurrence, and be not lodged in a convenient matrix, they are not excited by the efficacy of the Sun.

Rain water Browne regards as one of the convenient matrices; "Rayne water wh. containeth the seminall atomes elevated by exhalations making the earth fruitfull where it falleth." The earth, impregnated by these seminal atoms, remains fruitful for a long time, as Browne discovered in a garden which was turned over after ten years. This garden manifested, he remarked, "how lasting the seminall principles of bodies are, how long they will lye incorrupted in the earth, or how the earth that has been once impregnated therewith may retaine the powers thereof unto opportunity of actuation or visible production." Browne analyzed rain water and found evidences of immortality. Though "appearing pure and empty," this water "is full of seminal principles, and carrieth vital atomes of plants and Animals in it, which have not perished in the great circulation of Nature." Corroboration came not only from the generation of insects from such water and from the fructification of plants thereby, but, most interestingly,

"from vegetable figurations upon the sides of glasses, so rarely delineated in frosts." This intriguing instance of panspermatism seems greatly to have excited Browne's imagination. He peered for hours to discover "the emergency of the first vegetable Atome" of duckweed from water. To explore the phenomenon of vegetable figurations he devised some ingenious experiments. He examined not only rain and snow water for plant figurations, but solutions of salt, sugar, and plants, jellies of flesh, and urine. He congealed jellies of calves' feet and found foliations, "which being beheld in a magnifying glasse either in the day or night agaynst a candle affordeth us one of the most curious spectacles in nature." Such figurations he kept whole for two or three years.³⁶

The atom of duckweed and the vegetable figurations illustrate how various strands of generation theory had to be combined before Browne could see what he thought he saw. Preformation, atomism, panspermatism, and spontaneous generation wove the pattern of these "phenomena": the duckweed (1) was epitomized (2) in an atom, which (3) was dispersed through the great circulation of nature and (4) was spontaneously generated from water. In the vegetable figurations, the atom was arrested at the third stage of this process, and frozen.³⁷ The adventures of this atom exhibit the striking features of all Browne's biology, of his science of body and soul—its eclecticism and its vitalism. Involved with these adventures in spontaneous generation are strands of theory as diverse and as ancient as those involved with his concept of sexual generation. All Browne's biology (that is, the greatest part of his science—his concepts of digestion, of respiration, of circulation, and of sensation, as well as those of generation) reveal such universal borrowing and such unconscious synthesis. They reveal also an animistic view of matter and a vitalistic view of life which have significant implications for his philosophy and, ultimately, for his art.

II. THE PHILOSOPHY

4. *The Philosophic Imagination*

THE INFLUENCE of his great learning, of his constant research on Browne," observes Walter Pater, "was its imaginative influence—that it completed his outfit as a poetic visionary, stirring all the strange 'conceit' of his nature to its depths."¹ The significance to Browne of his learning, of his constant research in science can become clear only through a study of his imagination, the alembic which alone has power to distill meaning from experience. What use did his imagination make of his science? This will be our general question.

As the creative power which synthesizes experiences, imagination is the moving principle in science, philosophy, and art. Of Browne's scientific imagination we have already had abundant evidence, his amazingly inventive applications in the laboratory of inherited ideas, his correlations of fact and theory within the boundaries of an individual science. The philosophic imagination reaches beyond local boundaries to the ultimate questions about the nature of reality.² For Browne, all the data of science are visible symbols of an invisible reality. (The great impulse animating all his scientific research is the desire to interpret this "stenography" of the world and so to arrive at an understanding of the mind of God.) The "philosophic" imagination is here distinguished from the "artistic," the former being associated with the understanding, the latter with the emotions as well as the understanding; the former correlating ideas, the latter translating abstract ideas into concrete symbolism—like that of imagery and music—which are ever the mark of literary art. The reason for making a distinction lies in Browne's own works. As a literary artist, Browne's reputation rests upon a comparatively small

number of outstanding passages. The difference between these passages and the greatest portion of his work will by this distinction perhaps become clearer.

The philosophic imagination is associated with the ultimate objects of human understanding. These ultimate objects are also the recurrent ones. Bacon had posited a threefold aim for philosophy, a knowledge of God, Nature, and Man.³ These are the conventional topics of Browne's day, and upon them Browne usually invokes the conventional assumptions. Implicit in them are more searching issues for which Browne has more searching answers: the ontological question concerning the texture of the universe—matter or spirit—and the cosmological question concerning the organization of the universe—pluralistic atomism or monistic theism.

The nature of Browne's conventional assumptions and of his more searching answers reveals the kind of influence that his science had upon his philosophic imagination; it reveals also the kind that it did not have. The influence was indirect: his science served as a catalytic stimulus for vitalizing current concepts rather than as a basis for evolving original concepts; it served as a medium for assimilating the old rather than as material for forming the new. For the searching ontological and cosmological issues of the texture and organization of the universe, the catalytic of his science proved more stimulating than for the conventional topics of God, Nature, and Man. Upon the question of matter and spirit, for example, Browne's imagination was most active, relating his biological experiences to the general question of the nature of being. Upon the specific topics of God, Nature, and Man, the pattern of convention is more conspicuous. Here Browne echoes the commonplaces of his day—that God's being is akin to light and to human reason, that nature is the art of God, that nature represents a great chain of being, that man is a microcosm, that witches exist as part of the supernatural

order and practice magic under the natural laws of correspondences. This echo of commonplaces achieves a personal tone to the extent that the minutiae of Browne's scientific experiences serve as concrete instances by which to interpret the generalizations of philosophy and the articles of faith. But it is still an echo of commonplaces. Browne's views are still assumptions of whose borrowed nature he is largely unaware; their a priori character indicates a tendency to withdraw from his experiences to the shelter of stereotyped responses. Browne's views, in short, indicate little tendency to construct new wholes, a posteriori, from his scientific experiences. This is, of course, the common human fault against which Bacon's "Instauration," heralding the criticisms of modern empiricist philosophies, was directed. Generalizations so often are, by deduction,⁴ imposed upon Browne's scientific material, not, by induction, derived from it. Though he does advocate the test of "experience" and depend upon it in his science, Browne's philosophic imagination reveals, in some respects, comparatively little use of the inductive process. Rarely does he, as Bacon recommended, arrive at new generalizations superior to the old. Only too often does he "entreat a courteous assent" from "postulated or precarious inferences," rather than compel a mandatory assent from experience. This failure to construct new wholes is related to that of the general structure of the *Pseudodoxia*—its casual, digressive approach. It is indicative of the absence in Browne of architectonic imagination, an absence which his art, for all its lyrical grace and poignancy, also reveals.

The failure to draw inferences is a characteristic of Browne's imagination that we have already observed. We have seen how diverse and even contradictory theories of science could lie side by side in his mind. Thus the "atom" of duckweed, which so literally sprouted from water, depended for its "emergency" upon the mutually inconsistent theories of preformation and

spontaneous generation. Thus the "parts" of the seed, which accounted for heredity, involved in their operation a very un-Aristotelian, physical pangenesis and a quite Aristotelian, metaphysical Idea. In Browne's theories of digestion and respiration similar medleys occur. Generally speaking, the diverse elements of Browne's science were not synthesized into a coherent view, but were left to contribute to the eclectic heterogeneity of his mind. Not only is there a failure, then, within Browne's philosophy, because of a lack of induction from scientific experiences to original philosophic concepts, but also a failure within his sciences, because of a lack of induction from scientific experiences to scientific concepts. Browne's sciences are replete with concepts borrowed in his extensive reading and assimilated in varying degrees to his equally extensive experiences. Every age has its unquestioned assumptions, or assumptions questioned at most by the vanguard. Browne's science did not arouse him to such questioning; it did not, that is, directly influence his philosophic imagination, inciting him systematically to induce his own generalizations, to raise a manifold philosophic structure of his own.

Though there is no original integration in Browne, then, there are varying degrees of assimilation. Though he reveals no architectonic imagination, he does reveal fragmentary reconstruction, intermittent flashes of insight into his inherited complex of ideas. These appear occasionally and casually throughout his writings, and must, like his scientific ideas, be assembled from their loose contexts into a natural context of their own, before the native hue of Browne's thinking can be distinguished from the pale cast of conventional thought. For his intermittent imaginative response Browne is indebted to his science. The worn coin of the intellectual realm was freshly minted in his laboratory. There his daily applications of hackneyed concepts, his swift improvisations for the slow ideas of the ages, the retroaction of his

experience upon his theory—clearing for him new avenues of speculation, enabling him to solder new connections within his complex of ideas—this intellectual ferment is the debt Browne's imagination owes to his science. The extent to which the medley of intellectual currents in the seventeenth century achieves a meaning for Browne, the extent to which his human weakness is overcome, will be our measure for the influence of his science upon his philosophic imagination.

5. *Matter and Spirit*

SIGNIFICANTLY, it is on the crucial ontological question that Browne's philosophic imagination brings his science most directly to bear. The question itself was dramatized in the seventeenth century by the impact of the new philosophy upon the old. All three of the fundamental ontological approaches were developed in their sharpest outlines in Browne's day: materialism by Thomas Hobbes, who asserted that bodies and motions alone explain reality; dualism by Descartes, who marked an absolute division between body and mind, *res extensa* and *res cogitans*; and idealism by the Cambridge Platonists, who asserted the "seniority" of spirit over matter. Most of the great names of this great century are associated with the question: the philosophers, such as Hobbes and Henry More, being occupied with the relationship of matter and spirit; the poets, such as John Donne and Milton, being occupied with the relationship of body and soul; the scientists, such as Robert Boyle and Sir Isaac Newton, being occupied with matter itself, its structure and the laws of its motion. The agitation of this question produced many crosscurrents, which Browne, connoisseur of ideas, reflects. In the background of this contemporary scene was an inheritance to which Browne was no less sensitive: the thought of the ancient atomists, of Plato and Aristotle, of the Neoplatonic and Christian tradition. "I have run through all sorts of philosophies," he candidly remarks, "yet find no rest in any."¹ However, one clear tone rings from him above contemporary and traditional complexity. The Hellenistic and Christian emphasis on ideal entities, just in the process of being challenged by the new materialism, is still Browne's bias.

Browne's quest for truth gains its most satisfying answers in the realm of biology. His conception of life itself is idealistic. That is, of the two basic types of biological theory, vitalistic and mechanistic, he adheres to the former. He regards life as qualitatively different rather than as quantitatively derived from the structure and movement of lifeless matter. All living beings share in a vegetal or nutritive soul. This soul is a kind of fire, as spirit and God are a kind of light. The nature of that light may indeed be partially inferred from the nature of that fire. And the nature of that fire is a vivid datum of Browne's biology, one susceptible of scientific investigation. Digestion is thus for him a process of "concoction" or cooking, of "chilification by the process of natural heat." Respiration is "the contemperation and ventilation of that fire always maintained in the forge of life." For Browne the fire of life is more than a figure of speech. Vital heat is the condition of life. Upon it is founded the physiology of Browne's master, Aristotle. Upon it depends the formation of the body in generation and nutrition. The nutritive soul, which is included in the sensible and rational souls and which "moves" both nutrition and generation, is located in the hottest part of the body—the heart in sanguineous animals. ("Life," says Browne, "is a pure flame, and we live by an invisible Sun within us." Spirit, moreover, is also like the sun, and so is God. Browne's Aristotelian physiology gives experimental conviction to his conception of the nature of being.

The pure flame of life, which explains the nature of concoction and of refrigeration in Browne's theories of digestion and respiration, is akin to the nature of angels, who are like "light in the Sun and Elements." So, too, light is the shadow of God. The vitalistic association between life, soul, and fire which is central in Browne's physiology becomes also an idealistic association. That is, it establishes a connection not only between plants and animals, but between these and spirits, the higher links in the

chain of being. It leads to an understanding of the nature of God, the great goal of Browne's scientific quest. The old mystical doctrine—echoed in Plotinus, Dante, and Milton—that the Divine is akin to light has become more meaningful for Browne in his laboratory. The extent to which his imagination here assimilated his science to his philosophy is evident in the artistic expression he gives this concept. The basic image in one of his few poems, where he attempts to express the response of his flaming heart to God, is the revivifying power of the sun, the sun which, with water, is the great cause of spontaneous generation, of the literal vivification of apparently lifeless matter:

O how this earthly temper doth debase
The noble Soul, in this her humble place;
Whose wingy nature ever doth aspire
To reach that place whence first it took its fire.
 . . . let Thy Light divine
Be as the Sun to this poor Orb of mine;
And to Thy sacred Spirit convert those fires,
Whose earthly fumes choak my devout aspires.

Browne indeed makes quite explicit the association between his science and his philosophy, between his vitalistic concept of life and his mystical concept of spirit. "I am sure," he says, "there is a common Spirit that plays within us, yet makes no part of us: and that is the Spirit of God, the fire and scintillation of that noble and mighty Essence, which is the life and radical heat of Spirits, and those essences that know not the virtue of the Sun." Life is a radical heat, life is a flame, and all are of the nature of spirit. "Conceive light invisible and that is a spirit." And so the old image of a God, who, with mighty wings outspread, dove-like sat brooding on the vast abyss and made it pregnant, is subtly but definitely modified by Browne's scientific orientation. The heat of the nutritive soul, which governs the "faculty" of

generation as well as that of nutrition, together with the heat and water requisite for generation in the Paracelsian doctrine of "putrefactive generation," are fundamental both to the concept and to the image of God as "that gentle heat that brooded on the waters, and in six days hatched the World." Browne's physiology and, more generally, his vitalistic biology, is thus a major ingredient and solvent among his inherited idealistic concepts.²

The nature of being is for Browne most clearly revealed in the processes of generation, of biological causation and development. In the human semen, the human embryo, the human being, the interpenetration of matter and spirit in the universe becomes, as it were, crystallized. Aristotle had made a practical application of his metaphysics in his analysis of the male semen. This was a composition of matter and form. The semen which was to form the animal already was that animal undifferentiated; it was, Aristotle held, the animal potentially "either in virtue of its own mass or because it has a certain power in itself." Harvey, Browne's second guide, somewhat modified the technique, though not the principle, of Aristotle when he found the origin of the individual not in the semen of the male but in the egg which resulted from a union of male and female. This egg was a potential animal and contained within itself a moving principle or efficient cause. In any event, the seed, however defined, was a material substance and a potential organism, containing a moving principle to turn this potentiality into actuality. Browne theorized upon the metaphysical nature and experimented upon the chemical properties of the seed, the semen, and the egg. He rejects the suggestion, adopted by Fabricius, that the semen is only spirit, which influences the egg by a kind of irradiation; he discountenances also Harvey's suggestion that "the embryo is produced by contagion," as diseases are transmitted. The propagation of one is, he says, "in a strict acception, some minoration of another." The parent loses a physical part of himself according to Browne's theory of

heredity. The physical nature of the semen Browne analyzed in his laboratory, this semen which somehow contains even acquired characteristics, and though white in appearance transmits the blackness of negroes. The semen is psychical as well as physical, it contains the Idea of the individual. Or rather, it contains many Ideas, according to Browne's version of pangenesis. Each particle in the seed is a physical contribution of a parent representative of one of his bodily parts and is simultaneously an Idea of the whole individual. "Parts of the seed do seem to contain the Idea and power of the whole." The power of this spiritual aspect of the seed is tremendous for Browne. Twins or quintuplets arrive when the Idea "multipliciously delineates" the parent. The Idea has power also to make good missing parts: "so parents deprived of hands beget manual issues. . . ." The Idea is most fecund; it accounts for mutations, for the variation of the species. Such variations originate in "equivocal seeds and Hermaphroditical principles, which contain the radicality and power of different forms." As efficient cause, the Idea in the seed accounts for the actual process of embryonic development. It is the "plastic principle" whose physical location within seeds of various plants Browne tried with infinite care to isolate. In animal embryogeny "the plastick of formative faculty, from matter appearing Homogeneous, and of a similiary substance, erecteth Bone, Membranes, Veins, and Arteries; and out of these contriveth every part in number, place, and figure, according to the law of its species." The "Idea and power of the whole" which lies within the seed is thus an Aristotelian "formative operator" which from divided materials will attempt entire formations. It is such an invisible reality—Platonic and immutable, Aristotelian and dynamic—that Browne holds to, against the preformationists' actual and material embodiment of a miniature individual in the seed. By such a reality, Eve already existed in the rib of Adam: the generation of Eve, though perhaps not regular, was certainly

epigenetic. Bodies, indeed, are but "habits of their forms," clothing the Ideas. The human seed is a composite of matter and spirit precisely because the human body itself is such a composite: "For in every part from whence the seed doth flow, there be contained the Idea of the whole." For Browne the union of body and soul was capable of scientific proof, proof which he thought he found in his studies of the generation of plants and animals. "In the seed of a Plant, to the eyes of God and to the understanding of man, there exists, though in an invisible way, the perfect leaves, flowers and fruit thereof; for things that are *in posse* to the sense, are actually existent to the understanding." Not only the seed, but also the ashes of a plant contain the invisible reality, as is indicated by the revival of a plant from its ashes. This revival, "made good by experience," Browne uses as evidence of the immortality of the human soul. The body and soul of man furnish only a more glorious example of the union of matter and spirit, a union that can be more expeditiously tested in lower forms of life. The Idea in the seed exists just as the "Ideated Man" existed already before the creation in the intellect of God. The Idea in the seed sheds a ray of light for Browne not only on the nature of life but also on the nature of the Supreme Intellect.³

The idealistic implications of the plastic principle in seeds, and generally of the Idea in body, are more clearly formulated in the theories of the Cambridge Platonists, who reintroduced the Platonic doctrine of plastic nature as a medium through which God works in the slow and occasionally inept processes of nature. For them the plastic nature was directly an instrument of the world soul. Henry More talks of a world soul pervading the whole universe and "exercising a plastical power therein." For Ralph Cudworth, plastic nature is "an inferior and subordinate instrument drudgingly executing that part of Providence which consists in the regularly and orderly motion of matter." Like

Browne's Idea, which is contained in every part of the body, Cudworth's plastic nature is "reason immersed and plunged into matter, and, as it were, fuddled in it and confounded with it." Browne keeps his applications of the plastic principle more strictly within the grooves set by Aristotle in the discussion of generation, and so reveals a conception of reality in which matter is more equal to spirit than it is with the Cambridge Platonists. Still, his emphasis upon the power of the Idea, of the formative operator, is marked by the idealism which receives so much more careful elaboration by More and Cudworth. Joseph Glanvill very well points the *a priori* and idealistic nature of these conceptions when he criticizes the plastic principle with Baconian incisiveness: "The *Plastic* faculty is a fine word: but what it is, how it works, and whose it is, we cannot learn; no, not by a return into the Womb." ⁴

The primitive substance of humanity casts an illumination upon the nature of reality. So too does the primitive substance of the cosmos. The animism of the universe is for Browne implicit in its chaos. Bound up with his conception of the chaos are his beliefs in spontaneous generation (the emergence of living from lifeless matter) and in panspermatism (the universal distribution of "seminal principles"). Both spontaneous generation and panspermatism depend upon a vital principle that rolls through all things, a common soul more diffused than the specialized Idea of sexual generation. The chaos, like the seed of life, is a composition of matter and spirit. It is less susceptible than is the seed to analysis of its material aspect, but even so Browne ventures out upon it in his notes on coagulation. He thinks of its elements as earth and water, the latter of which serves as the great panspermatic medium. "Whether the first masse were but a coagulation whereby the water & earth lay awhile together, & the watery or serous part was separated from the sole & continuating substance. . . . The star(r)es separated by coagulation, & the in-

ner part flowing about them." This would be added evidence that "water is the principle of all things," and that "bodies are first spirits," as Paracelsus affirmed. In the chaos existed the "great circulation of nature," the animism of "dispersed Seminalities," which then were "scattered through the whole Mass of Earth, no place producing all, and almost all some." ⁵ Browne's chaos may indeed at times even become an imaginative version of the most outright theories of panspermy, theories elaborated by extremists such as Charles Bonnet, wherein the seminal particles account for all generation, sexual as well as spontaneous, entering as they do the ovaries and testes directly through food, etc. Browne fuses the dispersed seminalities with the Ideas when he says "Legions of seminal *Ideas* lie in their second Chaos and Orcus of Hippocrates, till putting on the habits of their forms, they show themselves upon the stage and open dominion of Jove." ⁶

Browne's imaginative excitement in the nature of the creation was stimulated by his milieu and developed by his science. The possibilities of new worlds which the telescope unfolded led to a popular interest during his day in the origin of the cosmos and of life. The new horizons of astronomy affect Browne's cosmology too. "While we look for incorruption in the heavens," he observes, "we finde they are but like the earth; Durable in their main bodies, alterable in their parts: whereof beside Comets and new Stars, perspectives begin to tell tales. And the spots that wander about the Sun, with Phaeton's favour, would make clear conviction." ⁷ For Browne the dynamics of a new cosmos were realizable in biological terms. The general interest in cosmogony was fortified by personal observation. Browne's science and his imagination interacted: he invented new experiments and these led to new reflections, to a fresh understanding of the cycles of life and death, of popular associations among the chaos, the womb, and the grave. As Browne was

examining rain water under a microscope for evidences of panspermatism, as he was lying hours on end watching for the first sign of the vegetable atom of duckweed—evidence of both panspermatism and spontaneous generation—as he was testing innumerable animal parts in coagulation, his science was performing its catalytic function for his imagination, enabling him to assimilate in his way the conventional themes of his time, themes employed, for example, by Spenser and Milton.

In the description of the Garden of Adonis in *The Faerie Queene*, Edmund Spenser gives an allegorical account of generation:

For in the wide wombe of the world there lyes,
In hatefull darkness and in deepe horrore
An huge eternal chaos, which supplies
The substance of natures fruitful progenyes.

The association between the chaos and the womb impressed itself on Browne. When discussing "the truest Microcosm, the Womb of our Mother," the analogy of the chaos comes immediately to his mind: "For besides the general and common existence we are conceived to hold in our Chaos, and whilst we sleep within the bosome of our causes. . . ." "The seeds of which all things at first are bred," Spenser had said, "shall in great chaos womb again be hid." This association is clarified for Browne by the doctrine of panspermatism. The substance of the universe is buzzing with life. Browne talks of "the Seeds and principles in the womb of Nature," where all the elements are in their pregnant causes mixed. More generally, the association is an animistic one. The substance of the chaos is analogous to that of an egg. The coagulating principle of a star, or of the "first masse" in which "the watery or serous part was separated from the sole & continuating substance," is the same principle which operates in generation: "How far the coagulating principle

operateth in generation," Browne had remarked, "is evidenced from eggs which will never incrassate without it." The chaos is like a womb because the primitive substance of the cosmos is akin to the primitive substance of humanity. The possibilities in both are similar, and they are biological. Generation, as Browne regarded it, is the "great work whose wonders are only second unto those of the Creation, and a close apprehenseion of the one, might perhaps afford a glimmering glance of the other." ⁸ The common existence in the chaos is like that in the womb. It is like that in Harvey's "egg," source of all life, which egg in turn is the analogue of Browne's "seed." The chaos, the womb, the egg, the seed—all of them pregnant causes, all of them composites of matter and spirit—are indices to the common nature of things. The macrocosm is akin to the microcosm, and the truest microcosm is the womb of our mother.

The relationship between the chaos and the womb illustrates for Browne the biological nature of reality. So too does another popular relationship, one made by Milton when he speaks of "the womb of Nature and perhaps her grave." This too Browne's panspermatic doctrine will clarify. The generative particles of panspermatism are immortal; upon the death of an organism they retire from their deceased habitation and find a new one. Browne, we may remember, found intimations of this immortality in a garden which was turned over after having lain fallow for ten years; he remarks, "how lasting the seminall principles of bodies are, how long they will lye incorrupted in the earth, or how the earth that hath been once impregnated therewith may retaine the powers thereof unto opportunity of actuation or visible production." Putrefaction, from this point of view, is a process by which generative particles move from old to new organisms; as such it was Paracelsus' fundamental principle of generation. The grave is, therefore, not unlike the womb; it is a birthplace as well as a resting place. The associations among

chaos, womb, and grave were firmly cemented by Browne's imagination, associations which cast the glow of life's vital flame upon the nature of reality. In a striking sentence Browne combines many strands from his network of generation theory and dramatically illustrates these associations. The sentence occurs in a discussion abounding with implications of animism in the universe, especially in the chaos at the time of the creation. According to popular belief, highly complex organisms were at one time spontaneously generated, like the innumerable living creatures of Milton, limbed and full grown, teeming at a birth when the earth at God's command opened her fertile womb. The conceit, says Browne, that men had their beginning from the soil, that they literally sprang up, as aborigines, is more justly appropriable to the end of the world. "For then indeed men shall rise out of the earth: the graves shall shoot up their concealed seeds, and in that great Autumn, men shall spring up, and awake from their Chaos again." ⁹

From panspermatism and spontaneous generation, it is not a great step to pantheism. From the dispersed seminalities capable of being fired into life at the touch of the sun, it is not a great step to the world soul of such an idealist as Henry More. Indeed More also was concerned with panspermatic elements. "The primordials of the world," he said, "are not mechanical, but spermatical or vital. . . ." In the *Immortality of the Soul*, More talked of a world soul "without sense and animadversion prevailing the whole matter of the universe." It was of this world soul that the Cambridge Platonists' plastic nature, which so resembled Browne's Idea, was an instrument. Such a world soul appeals to Browne. It is, characteristically, not integrated with his other concepts, like that of the Idea, to constitute an imaginative union similar to that of the Cambridge Platonists. Rather it is presented in the form of a suggestion from Plato and "the Hermetical philosophers," a gratuitous item among

Browne's idealistic concepts: "Now, besides the particular and divided Spirits, there may be (for ought I know) an universal and common Spirit to the whole world. . . . If there be a common nature that unites and tyes the scattered and divided individuals of one species, why may there not be one that unites them all?" The connection between panspermatism, spontaneous generation and this world soul is illustrated by one of these very "Hermetical Philosophers" to whom Browne refers, Robert Fludd, who attempted to prove the existence of a universal soul by the doctrine of spontaneous generation. It was a connection that was soldered for Browne through his science. That science led him to thoughts of a pantheistic nature, of a material-spiritual composite substantiating man and the universe, the microcosm and the macrocosm. "Do but extract from the corpulency of bodies," he says, "or resolve things beyond their first matter, and you discover the habitation of Angels, which if I call the ubiquitary and omnipresent Essence of God, I hope I shall not offend Divinity: for before the Creation of the World God was really all things." His Christian and conventional terminology has its scientific and personal counterpart. The Idea plunged into the seed, the Idea fuddled and confounded with all parts of the human body, the vital principles entering and leaving organisms in the cycles of life and death, in the chaos, the womb, and the grave, all were specific instances which helped to illumine Browne's general concept of the nature of being as animate, of the creation as a part of God. In the laboratory Browne found inklings for his philosophy, or, as he calls it, his "Divinity." When he isolated the neb or "plastic principle" in seeds, when he watched "the plastick of formative faculty" erect bones, membranes, veins, and arteries in frogs and men, when he found traces of the original plant in its ashes, when he examined "vegetable figurations upon the sides of glasses, so rarely delineated in frosts," when he congealed jellies of calves' feet and found

foliations of plants "which being beheld in a magnifying glass ether in the day or night agaynst a candle affordeth us one of the most curious spectacles in nature," when he eagerly searched these and other solutions of his own invention for those immortal "seminal atoms," just as when he peered at those "strange and mystical transmigrations" of silkworms, he was fortifying his Aristotelian outlook and ultimately his Christian belief. He found inklings of pantheism which could lend support to his theism, if only as tentative suggestions in a work like the *Religio Medici*, a work purporting to defend the medical profession against the charge of atheism. For after his suggestion of the "common Spirit to the whole world," he proceeds quite easily to a discussion of "the common Spirit that plays within us," the Spirit of God which is the life and radical heat of spirits, a discussion which merges into one of individual spirits, tutelary and guardian angels. And this latter discussion in turn takes him back along pantheistic by-ways: "Now for that immaterial world, methinks we need not wander so far as beyond the first moveable; for even in this material Fabrick the Spirits walk as freely exempt from the affection of time, place and motion, as beyond the extremest circumberence," these Spirits which are really the ubiquitary and omnipresent Essence of God.¹⁰ God is all in all. No more than the poet of *Paradise Lost* was Browne concerned over nice conceptual distinctions. Was not faith to be supported by reason, and that by sense? The reason and sense were supplied from Browne's philosophy and science. In so far as his imagination reconstructed it, reality for Browne is predominantly vitalistic. He conceives it in biological rather than in physical terms. The terms "body and soul," rather than "matter and spirit," might for that reason better indicate his conception of the basic relations within nature. In the unformed materials of living organisms, in the unformed materials of the chaos, in the microcosm and the macrocosm, bodies are the habits of their

forms, a compound of body and soul. And God made it all. His philosophy stirred Browne to scientific inventiveness; his accumulation of data clarified and fortified his inherited philosophy and religion. And, happily, all this intellectual ferment excited him often, during even the most objective scientific expositions, to artistic utterance.

We have now to consider Browne's atomism, an answer to the cosmological question of the connection between things. To what extent did Browne's atomism influence his conception of reality? Was he led by it to materialism? Did he integrate it with his idealism to arrive at a spiritual monadology? ¹¹ Or did he fail to plumb its metaphysical foundations?

Browne's concept of atomism is revealed in his extensive researches on magnetism and electricity. There he is concerned not with atomism as such, but with the secondary doctrine of "effluvium" or "effluxion," a material emanation from bodies. Following William Gilbert's conception of the earth as a magnet, Browne attributes its magnetic attraction to the penetration of all bodies by earthly effluxions. For the actual method of penetration, he retails alternative explanations:

Now whether these effluviūms do flye by striated Atoms and winding particles as Renatus des Cartes conceiveth; or glide by streams attracted from either Pole and Hemisphere of the Earth unto the Equator, as Sir Kenelm Digby excellently declareth, it takes not away this vertue of the Earth, but more distinctly sets down the gests and progress thereof, and are conceits of eminent use to salve Magnetical Phenomena's.

The phenomena of electricity he considers together with those of magnetism. Though he distinguishes between the two, he explains the attractive power of "bodies electrical" and that of "Bodies magnetically" by the same doctrine of effluvium. He lists in detail electrical bodies known to Gilbert, Nicolaus Cabeus,

and himself, a great number of which he has tested: diamonds and other stones, hard wax, glass, turpentine, etc. These, though not metallic, seem to have attraction like metallic bodies. "But how this attraction is made," he observes, "is not so easily determined; that 'tis performed by effluvioms is plain." This is proved by the fact that electrical bodies must be heated and cleaned by rubbing—"if they be foul and obnubliated, it hinders their effluxion." For the physical explanation of the action of effluvioms in electrical bodies, Browne depends upon the theories of Cabeus, Digby, and Descartes. Cabeus held "that this effluviom attenuateth and impelleth the neighbor air, which returning home in a gyration, carrieth with it the obvious bodies unto the Electrick." This action is illustrated by "Atoms or Motes in the Sun," when particles of dust in a ray of sunlight are observed to circle back into their places again after being stirred by a breath of air. The second theory, which Browne found in Digby's *Of Bodies* and Descartes' *Principles of Philosophy*, explains the action on the basis of a "tenuous emanation or continuous effluviom" from oily bodies, which effluvioms on returning carry back in their "viscous arms" all adhering material. This Cartesian effluviom, borrowed by Digby, is not strictly atomic, but rather continuous, Descartes' atomism not being genuine—not admitting a void nor allowing the atoms to be indivisible.¹²

Browne thus applies to electricity and to the magnetism of Gilbert, who was not himself an atomist, the popular seventeenth-century doctrine of effluviom. This doctrine, originating with the Greek atomists, holds that from all things there constantly flow off films, or images, which retain the figures of their objects. In Browne's day the doctrine was elaborated by Robert Boyle, the outstanding atomist and the father of the "Corpuscularian Philosophy," who thought that he demonstrated the existence of effluviom by vaporizing water and then condensing

it. Browne applies the doctrine to other phenomena besides electricity and magnetism. Indeed the variety of uses that he, in common with his contemporaries, found for effluviiums shows how they struck his fancy. Combustion arises from "sulphureous inflamed and even vitrified effluviiums and particles." Comets may be the effluviiums of stars. The "sick *effluviiums*" of the roots of trees cause other trees to die. Effluviiums are perceptible through odors. The spread of disease, the influence of medicines and poisons can be explained by them. Chemists, such as Jan Baptista van Helmont, had long relied upon effluviiums to explain invisible reactions. Harvey had referred to popular beliefs relating, as the results of effluviiums, phenomena such as disease infection and magnetism. Digby used them for his fantastic "Powder of Sympathy," explaining superstitious cures, as that of toads for venomous wounds, on the basis of the attraction of like atoms for like. Boyle himself wrote "Of the reconcileableness of specific medicines to corpuscular philosophy." Such uses Browne, too, found for the corpuscular philosophy.

Browne proves the medicinal virtue of gold, the sovereign specific of alchemical tradition, by the analogy of the loadstone, which continually emits effluviiums without loss of weight. Bodies "may emit vertue and operation" through their effluviiums, and so gold as an ingredient in medicines may "impart some effluences unto the infusion, which carry with them the several subtilities thereof." He suggests that "exact and critical trial should be made by publick enjoinment" to settle this question. One of the richest passages in all the *Pseudodoxia* is that on the basilisk's ability to kill at a distance by shooting poison from its eye. This superstition Browne seeks not to disprove, as might be expected, but to defend upon the basis of his versatile doctrine. The basilisk's power involves not only poison but poison through the eye, and so Browne has to explain not only the spread of disease but the process of vision, an application of the doctrine to the phe-

nomena of sensation that had been made already by the Greek atomists and popularly in his own day by Digby. If "pestilential Atoms" may be conveyed over great distances, if the shadows of some trees be noxious, diseases may be transmitted also through the optical organs. The effluvia "do carry with them the qualities of the object from whence they flow, and the medium through which they pass." Thus will all things appear red when seen through a red glass. And thus will the sore effluvia of a sore eye infect not only the sound eyes of others but even itself by reflection, "as will happen to an inflamed eye that beholds itself long in a Glass." Finally, the fascination of the evil eye can thus become a rational tenet. The doctrine of effluvia was deservedly popular. It could rationalize many a favorite superstition, many an occult influence, effecting a superficial compromise between magic and science. Well might Browne observe, "Truly the doctrine of effluxions, their penetrating natures, their invisible paths, and unsuspected effects, are very considerable." ¹⁸

However, more significant for our purposes than the varied applications which Browne finds for his doctrine of effluvia are some which he does not find. In spite of its manifold applications, the doctrine holds for him few implications. In spite of the wealth of his data, his imagination fails to correlate these, to educe from them a common foundation, materialistic or idealistic, in the nature of things. Atomism is related for him neither to mechanism nor to teleology. The omission of final cause, the rejection of teleology for mechanism, a feature of the newly revived atomism of the ancients, was a tendency of the new philosophy, illustrated, for example, in Bacon, Hobbes, and Spinoza. Such a tendency Browne does not share; his teleology is in no way modified by his manipulation of the atomic theory. Quite the contrary. He shares rather the strict Christian's horror of materialism. Though he is credited with writing the first pointed defense in English of Epicurus, what he defended was

the character of the philosopher, not that of the philosophy. The "infamous name" which Epicurus left behind as a sensualist, says Browne, is a vulgar error which traduces the philosopher's asceticism and dedication to intellectual pursuits. However, though conceding Epicurus to have been "the virtuous heathen, who lived better than he spake," he charges him at the same time with "erring in the principle of himself," that is, with erring in his materialistic conception of man. The contrast of the false position of this materialism as against the true one of Christianity Browne draws vividly and wittily in the *Urn Burial*, where the virtuous philosopher is shown lying far below the elect company of martyrs, who are by merit raised to "the Orchestra and noblest seats of Heaven," the heretical philosopher lying deep in a Hell whose existence he had denied. Again, Browne is anything but enthusiastic about the Epicurean philosophy of Lucretius, concerning an edition of whose works he writes his son: "I do not much recommend the reading or studying of it, there being divers impieties in it, and tis no credit to be punctually versed in it." ¹⁴

It may be too much to expect Browne's researches in physics, in magnetism and electricity, his adroit manipulation of the doctrine of effluvium to modify materially his inherited and ingrained idealism. It should not be too much to expect him to incorporate the effluvioms, as he did the Idea and the seminal principles of his biological researches, with his central idealism. This too he fails to do. There are a few references which hint at a utilization of the atomic theory in his vitalistic biology. These references are, however, vague; they do not indicate a clear association between atomism and animism. In his theory of panspermatism he uses interchangeably the phrases "vital atomes" and "seminal principles," the minute particles which were scattered abroad at the creation and which enter such matrices as rain water and genital organs to cause spontaneous and sexual genera-

tion. He also talks of "parts" of the seed, dualistic "parts" which "seem to contain the Idea and power of the whole" individual together with a "material transmission" of the parents, and which, according to his theory of pangenesis, contribute to the heredity of the child. He does not, however, use the term "atom" in this latter connection, as did Nathaniel Highmore, whom he read. Even in the clearer case, that of the "vital atomes," he thought of these as distinct individualities, like separate seeds (the "vegetable Atome" of the duckweed for whose spontaneous generation he waited) rather than as component atoms of a common substance—indivisible particles in a void together constituting the material of bodies. As for the "parts" of the seed, there he clearly neglected a correlation within convenient reach on a subject very near to him. He did not follow the growing school of atomistic embryology, of which Pierre Gassendi and Descartes in the 1650's and 1660's were leading exponents. He had certainly become acquainted with such theories in Highmore's *The History of Generation* (1651), which explains sexual generation on the assumption that seminal atoms from both parents combine to form the fetus. For Highmore, as for Aristotle, the male seed assumed the function of spirit, the female that of matter. The atoms of the male were "spiritual," coming from every part of the body; from the blood, said Highmore, "the Testicles abstract some spiritual atómes belonging to every part. . . ." Highmore's atomistic account of generation thus possessed, as a further recommendation for Browne, quite an Aristotelian flavor. Even so, he neglected it, as he neglected generally to associate his atomism with his idealism.¹⁵

Nowhere do the writings of Browne indicate that his philosophic imagination related the atomic theory to the central problem of being. Indeed, he indicates rather his uncertainty about the implications of atomism, that is, his failure to relate it to his pattern of ideas, in the very passage in which he admits its "very

considerable" possibilities. He confesses it to be "a part of Philosophy but yet in discovery and will, I fear, prove the last leaf to be turned over in the Book of Nature." Atomism was not for him a way of explaining the connections between things, the cosmical nature of being. It was but a plaything, with myriad applications, providing at best a factitious rationale for favorite superstitions. He fails on the one hand, to associate it, as he did his biology, with his Aristotelian and Christian teleology; and he fails certainly, on the other hand, to be led by it to a cosmological view which substitutes a fortuitous or mechanical concourse of atoms for the architectonic intelligence of God.

6. *God, Nature, and Man*

GOD WE BEHOLD but asquint, upon reflex or shadow, Browne remarks: "we are ignorant of the back parts or lower side of his Divinity." (Browne's attitude toward God reflects the traditions of both mysticism and rationalism. He loves to lose himself in a mystery, to pursue his reason to an *O altitudo*.) The rationalism of his science mounts to the mysticism of his Divinity. God is for him both a revelation and a rationalization, approached by inner light and by scientific proof. Browne's pantheism is a step toward his theism; upon the great world's altar stairs he mounts through darkness up to God. The altitude of his mysticism can be taken from the vantage of his science. The God whom we behold asquint, whose brightness is adumbrated in light, has an essential kinship to the light and heat of Browne's physiology. The Spirit of God is a "fire and scintillation" quite literally in the heart of man. It is the gentle heat that brooded on the waters during the six days of Creation. Not only the visible light of the sun, but the invisible flame of life is the shadow of God. The beatific vision of faith is that of a bright essence: "In the City of the new Jerusalem there is neither Sun nor Moon; where glorified Eyes must see by the archetypal Sun, or the Light of God, able to illuminate Intellectual Eyes, and make unknown Visions." Not only nutritive light and heat, but Browne's generative Ideas were altar stairs to God. The Idea in the seed was the archetype of the individual. Just so, God retains "in his Intellect the Ideal Existences of things and Entities before their Extances." He, Thomas Browne, existed "not onely before my self, but Adam, that is, in the Idea of God, and the decree of that Synod held from all Eternity."¹ In the

dispersed seminalities of Browne's panspermatic theory, in the resurrection of the plant from its ashes, the eternity of spirit and Idea, the immortality of the soul, were evidenced. Science supplied specific and for Browne intelligible instances of that attribute of God, His eternity, with which he delighted to confound his understanding. (He could imaginatively recreate mystical doctrine in terms of scientific experience.) The abstract Idea of epigenesis, the gentle heat of all his biology were the empirical instances which could lead to a projection of himself, the "Ideated Man," in eternity, in a great ring of pure and endless light. Browne too might have an inkling how good, how fair the world is, answering His great Idea. The idea could be conceived in terms of the world.

The mystical element in Browne should, of course, not be underestimated.) "And if," he declares, "any have been so happy as personally to understand Christian Annihilation, Extasy, Exelution, Transformation, the Kiss of the Spouse, and Ingression into the Divine Shadow, according to Mystical Theology, they have already had an handsome Anticipation of Heaven; the World is in a manner over, and the Earth is Ashes unto them." All that we truly love is invisible, "what we adore under the affections deserves not the honor of so pure a title." In the same things that we resemble God, we are utterly different from Him.² The characteristic theme of the *Religio Medici* is that Browne's haggard and unreclaimed reason stoops to the lure of faith. It is an idealistic faith in the "seniority" of spirit, in the ascendancy of the supernatural.

The nature of being is mystically felt as the nature of God's being. The idealism preponderant in Browne's metaphysics, in his views on matter and spirit, is inherent in his views on the supernatural and the natural—on angels, devils, nature, and man. "Metaphysical verity" is omnipresent. The empire of truth has place even within the walls of Hell; to it devils must them-

selves conform, "as having their essence conformable unto the Intellect of their Maker." The spiritual unity of all the creation with God, the "one link and common connexion, one general ligament, and necessary obligation of all whatever unto God," Browne illustrates in the Platonic concept of the chain of being, an orderly cosmic emanation from God: "for there is in this Universe a Stair, or manifest Scale of creatures, rising not disorderly, or in confusion, but with a comely method and proportion." The structure of order is hierarchical. Most akin to the intellect of God is that of angels, who "know things by their forms," just as God "beholds the substance of things as we their operations." The angels' mode of communication manifests this kind of intellection, one familiar from the Platonic conception of the realm of pure intelligence. The "intuitive" reason of Milton's angels is distinguished from the "discursive" reason of man. So too Browne's angels need not resort to the "accidents" of language, but by direct intellection they "intuitively conceive each other." However, spirits are not only metaphysical abstractions for Browne. They inhabit the local and lively cosmos into which the poetizing process of Christianity transformed the Neoplatonic chain of being. Angels may order our dreams or be our private guardians. The Devil himself is ever behind us. "Indeed though in a wilderness," Browne exclaims, "a man is never alone." Now that oracles are dumb, Satan, whose endeavors loom large in Browne's analysis of the causes of error, "runs into corners . . . acting his deceits in Witches, Magicians, Diviners, and such inferiour seducers." And so in new guise "Apollo's altar still doth smoak; nor is the fire of Delphos out unto this day." As an anchor of the supernatural, the Christian Devil has a secure position in the chain of being. To deny his existence or that of witches—"whose concession infers his co-existency"—is to annihilate the blessed angels and spirits in the rank of creation, and thus to destroy the cosmic principle: "how

many learned heads," says Browne with regard to witches, "should so far forget their Metaphysics, and destroy the ladder and scale of creatures, as to question the existence of Spirits."³ This argument, depending upon the assumption of a *plenum formarum*, was common in the days of Browne and More. The supernatural structure of faith was firm but delicate. The removal of one tier, like that of devils or witches, would cause a stupendous fissure, undermining the position of the human soul, of angels, and of God, destroying the order of the universe.

If the mystical element in Browne should not be underestimated, the rational element cannot be overestimated. The metaphysical verity of that spirit whose primacy and pervasiveness are manifest in the supernatural can be apprehended and clarified through reason and sense operating upon the natural. The higher links in the chain of being are shadowed in the animal hierarchy, the intuitive reason of angels in the discursive reason of man, the order of the universe in the structure and function of living nature, the divine human soul in the biological soul; even the preternatural pretenses of the Devil, the smoking altar of Apollo, can be clarified in the dry light of experimental science. It is still with his *reason* that Browne rises to an *O altitudo*. By the paradox inherent in Browne's philosophy, by the paradox inherent in the original Platonic distinction between the real invisible and the unreal visible, the former can be limned only by the latter. "Metaphysical verity" may be mystical and mysterious, yet we are not wholly unprovided in the quest for it. In the same things that we resemble God, we are utterly different from Him, yet He can be approached only through a development of that resemblance, the human reason. "The world was made to be inhabited by beasts, but studied and contemplated by man: 'tis the Debt of our Reason we owe unto God."⁴ The reflex or shadow of God, whom we behold but asquint, may become at least more defined through the "Exantlation of

Truth," through scientific discovery by sense and reason. It is thus that Browne's empiricism and rationalism fortify his mysticism. The scientific exploration of this world leads to the undiscovered country of the other world, and ultimately to the Intellect in which the whole creation participates.

Nature, with the aid of science, reveals both the glory of God and the machinations of the Devil. Science is the instrument which explains the supernatural in terms of its analogue, the natural, God in terms of His art, the Devil in terms of his magic. Nature as the art of God, magic as the art of the Devil, can be unveiled only by sense and reason. To express the intellectual beauty of the universe, Browne uses the ancient analogy of music, one strikingly illustrated in the Pythagorean music of the spheres. "From harmony, from heavenly harmony this universal frame began"; this analogy, echoed supremely in Sir John Davies' *Orchestra*, stirred Browne to the following brilliant recapitulation: Music is "an Hieroglyphical and shadowed lesson of the whole World, and creatures of God; such a melody to the ear, as the whole World, well understood, would afford to the understanding. In brief, it is a sensible fit of that harmony which intellectually sounds in the ears of God." The material for the hieroglyphical and shadowed lesson that is music, Browne found in the Norfolk marshes and in his laboratory. In his study of anatomy there was a mass of mysterious philosophy and such as reduced the very heathens to divinity. The "strange and mystical transmigrations" he observed in silkworms, he tells us, turned his philosophy into divinity. This is the motive which led him to pore over a microscope for long hours, watching, for example, the development of a frog's egg, discerning "the high curiosity of nature in these inferior animals, and what a long line is run to make a Frog." In all provinces of the animal kingdom Browne found evidence of the universal harmony. From the "Colossus and magestick pieces" of nature in whales, elephants and camels, to the "more

curious mathematics" in the delicate structure of bees, ants and spiders, all creatures of God exhibit His art. Browne says that he cannot tell by what logic we call a toad, a bear, or an elephant ugly, they being the embodiment of their inward forms and having passed the inspection of God. It is a vulgar error to say that the peacock will be ashamed when he looks at his legs; no part "can seem unhandsome to their eyes which hath appeared good and beautiful unto their makers." "Monsters" are exception to the course of nature. Thus serpents that are born with a head at either end because their eggs, linked together "sometimes conjoin and inoculate each other," are monsters, "beside the intention of Nature and the statutes of Generation . . . but irregularly produced, do stand as Anomalies in the Book of Nature."⁵

Browne's faith in nature as a work of reason, as well as of art, is likewise substantiated by his science. All things began in order, so shall they end, and so shall they begin again. Browne pursues this order, the higher geometry of nature, all through his *Garden of Cyrus*. The "mystical Mathematics of the City of Heaven" is reflected in the mundane mathematics of physical nature. Since God is reason, His creation, the macrocosm and the microcosm, exhibit the laws of reason. The "laws of true reason" are Browne's "common principles," which, like Herbert of Cherbury's "common notions," derive their validity from the universal consent of mankind.⁶ For Browne the "common principles" are unquestioned assumptions about nature, assumptions deriving largely from Aristotelian tradition. In his science Browne applies to specific instances in the macrocosm, or the external creation, these laws of the microcosm, or of his own being, these laws of reason, which then he calls "laws of nature." Browne's "laws of nature" are thus his unquestioned assumptions.

In the *Pseudodoxia*, examples are legion of the deductive

application of these generalizations about the reasonable order of nature, examples in which Browne applies to popular beliefs the "laws of true reason," or the "laws of nature," and so shows them to be vulgar errors: *Nature abhors superfluities*. This law he applies to the belief that the chameleon lives on air. If it did so live, he argues, its digestive organs would be superfluous, which would be an impossibility in nature. The chameleon must exercise its digestive organs, and hence must eat food. Likewise nature ordains but one "principal part" (liver, heart, or brain) and so the two-headed serpent is monstrous, an exception to the laws of nature. *Nature is uniform*. This law Browne applies to the belief that the deer lives hundreds of years. Its short periods of embryonic development and adolescence argue a short life; the phases of animal growth and decline "are proportionately set out by Nature in every kind; and naturally proceeding admit of inference from each other." Nature indeed is so uniform that its course is almost automatic, a hint of deism in Browne, a deism which many of these other "laws of nature" would support. "To make a revolution every day is the Nature of the Sun," he remarks, "because of that necessary course which God hath ordained it." The world is almost a machine that can run by itself: "Now this course of Nature God seldome alters or perverts." *Nature is varied and abundant, a plenum formarum*. This law Browne applies to the belief that creatures in the sea duplicate those on land—sea-horse, sea-dog, etc. To credit such a duplication is to "restrain the hand of God, and abridge the variety of Creation." *Nature is progressive*. This law he applies to the belief that a hare alternates yearly between male and female, that is, between "perfect" and "imperfect" sexes, a belief "injurious unto the order of nature, whose operations do rest in the perfection of their intents . . . and relapse not again into their progressional imperfections." ⁷

These assumptions about nature are implicit in Browne's tele-

ological view of causation. The laws of nature are not autonomous; they are rather secondary causes, dependent upon a First Cause, "the true and infallible Cause of all." The laws of nature exhibit "the wisdom of God," or its equivalent, "the providence of nature." God or his "hand and instrument," nature, ordains everything for the best. Hence nature is economical, uniform, varied, and progressive. Browne's reading would have reinforced his teleology. Aristotle, Galen, Fabricius, Paracelsus, van Helmont, indeed the corpus of Browne's biology, exhibit the argument from design. This argument is omnipresent in Browne's science. Nature has provided sea plants in order to shelter the spawn of fishes. The sea is calm during the nesting time of the kingfisher, so that the nests may float undisturbed. Though the seeds of ivy are all around, they sprout only where the ivy can be supported. "Surely many things fall out by design of the general motor, and undreamt of contrivance of Nature." And so, generally, there is no such thing as accident. Earthly misfortunes, such as diseases, are a judgment of God. Lady Fortune, in games of chance or in astrology, is not the final arbitress. Causes which "operate in a loose and stragling way" have their warrant from "some universal or superior Cause."⁸

(Browne is concerned with the influence of science upon imagination, an influence popularly recognized in his day. Nature is after the Bible the second book of God, "that universal and publick Manuscript, that lies expans'd unto the Eyes of all." It is a manuscript whose interpretation will yield a supernatural insight.) The mind of the artist can be read in His works. The teleological argument runs two ways. The art is derived from the artist, and the artist can be inferred from the art. God is the cause which produced the order, and in the order can be discerned the cause which produced it. This is the religious motive for the scientific study of nature; "this visible world is but a picture of the invisible." Browne uses the former as his only

access to the latter. The "reason" of his science is dedicated to the uses of religion. Browne's apologia for science is that the philosophical imagination can, by induction from its data, arrive at an understanding of the mind of God. The manuscript of nature is to be studied with the patience and industry Browne's own scientific researches so well exemplify: "those highly magnify him, whose judicious inquiry into his Acts, and deliberate research into his Creatures, return the duty of a devout and learned admiration." "In contemplation of created things," as Milton put it, "By steps we may ascend to God." This is the *religio medici*, Browne's defence against the "great scandal" of his profession, the charge of atheism. The phenomena of nature, like the hieroglyphs of the Egyptians, are physical symbols of a higher reality. "The Hand of Providence" he says, "writes often by Abbreviations, Hieroglyphs, or short Characters." Browne, quite aware of the uses of imagination, tried consciously to rationalize the articles of his faith, to decipher the "mystical Letters" in the manuscript of nature, to approach the invisible world through the "stenography" of scientific data.⁹

If God could be understood through science, certainly the Devil could too. The Devil, his magic, and his witches were delicately integrated with Browne's supernatural structure of faith. Though increasingly vulnerable to the attacks of the new learning, they could not be reasoned out of existence without catastrophic consequences to the whole structure. Yet, as a modern scientist, Browne crusaded against the magical superstitions of the vulgar. Because of the complexity of his attitudes—his partiality toward magic, his awareness of its false pretensions, and his equal awareness of the uncertainty of science—Browne's position with regard to magic is most equivocal. He espouses it, he attacks it, and he rationalizes it, all with the aid of his science.

Browne interested himself in the relation between magic and experimental science. Magic he defines as "effects derived and

fathered upon hidden qualities, specifical forms, Antipathies, and Sympathies, whereof from received grounds of Art, no reasons are derived." The history of science is that of the substitution of "reasons" for the "hidden qualities" of magic. For "traditional magic" proceeds "upon the principles of Nature, where actives, aptly conjoynd unto disposed passives, will under any Master produce their effects." A great part of science was at first witchcraft. As a "natural Magician," the Devil "may perform many acts in ways above our knowledge, though not transcending our natural power when our knowledge shall direct it." The advancement of learning has steadily abridged the magical liberties of the Devil. The discovery of "the verticity of the Loadstone" is a most recent example of such mortal encroachment upon his domain. He still knows many of nature's secrets yet hidden from man: "what, invented by us, is Philosophy, learned from him is Magick." ¹⁰

"Natural magic," which he distinguishes from "artificiall magic" (an art falsely supposed by conjurations and spells to command the powers of Hell), Browne can thus espouse as scientifically, or at least empirically, valuable. He will admit even the respectability of alchemy, of "those Arcana's whereby Paracelsus that died himself at forty-seven, gloried that he could make other men immortal." "Rightly understood," these do not impose any violence upon nature. The maggot of a goat's head may be good for the falling sickness, "for many things secret are true: sympathies and antipathies are safely authentick unto us, who ignorant of their causes may yet acknowledge their effects." Fairy stones "are most practically used against Films in Horses' eyes." In his notebooks Browne suggests some "odd medicines" for the gout-like shoes made of lion's skin—after "rationall medicines" have failed. He reminds himself to try amulets from the feet of a tortoise cut alive and worn in kid's skin, of spiders' legs worn in deer's skin. But Browne's science

leads him to attack magic as well as to espouse it. Authors who write of sympathies, antipathies, and of the occult generally, he says, are "suspicious." Satan deludes us "by Philters, Ligatures, Charms, ungrounded Amulets, Characters, and many superstitious ways in the cure of common diseases." The belief in amulets and "sympathetical Receipts" Browne holds up as an example of logical fallacy, "deriving effects not only from inconcurrent causes, but things devoid of all efficiency whatever." The occult generally, he says, "contemns the law of Reason, and defends itself by admitting no reason at all." ¹¹

Browne's apparent self-contradiction illustrates the interaction between magic and science in his day. In an age of scientific uncertainty, because of the paucity of fact and the shifting of theory, empiricism, whether magical or scientific, was the safest guide. A lion's skin may cure the gout, though the cause may be called occult or unreasonable. The truth lies in the effect; the cause is "secret" until science brings it to light. Amulets of lion's skin and spider's legs may seem to be curious examples of pragmatic truth, but none knew better than Browne how Janus-faced truth can seem. Medicine especially must be empirical. The remedy will be efficacious, though the cause be unknown, or magical. On the belief that the eagle stone may promote delivery or restrain abortion, Browne thus candidly remarks "we shall not discourage common practice by our question." So little was known, that little could be rejected. "Occult" remedies may work after "rational" ones have failed. Together with Bacon, Browne recognizes the historical dependence of science upon magic, and cannot draw too sharp a line between them. The term "occult" retains for him its original meaning, "covered up," and in that sense secret. It is not inherently secret but only temporarily so. When Browne says that it is "a great disservice unto truth" to invent or fail to investigate magical beliefs, "multiplying obscurities in Nature, and authorizing hidden qualities which

are false: whereas wise men are ashamed there are so many true," he best reveals his position on magic. Wise men are ashamed, because the existence of hidden qualities constitutes an admission of their ignorance as to the true operations of nature. The informing purpose of the *Pseudodoxia* is to clear the misty mid-region of magic. There we find him often on the dark trail of the occult, seeking to uncover it, to "relieve our ignorance of one occult quality" the more. He is most forceful, not when he attacks, but when he rationalizes the occult, applying to it his doctrine of effluvium. The merit of this nimble doctrine was that it could explain qualitative changes on the basis of invisible material actions. Gold might be a universal specific, imparting its medicinal virtue in a stream of material particles. Thus could the shadows of some trees be noxious, the torpedo stupify at a distance, the basilisk poison with its evil-eye, and thus "amulets and charms do work by emanations from their bodies, upon those parts where unto they are appended," producing "visible and real effects by imponderous and invisible emissions."¹² This rationalization does not, of course, penetrate very far, since the atomic theory upon which it rests was superficial, one whose metaphysical implications Browne did not realize. Browne's atomistic interpretation of magic, when he made it, was no more than the application, to an admittedly irrational belief, of a theory whose rationale was unclear to him.

This rationale was unclear partly because it was "but yet in discovery." The old rationale for magic was passing out of acceptance. Browne's equivocal position is a just reflection of the equivocal position of magic itself in the century of genius, in the changing tides of philosophies, old and new. The old rationale had been elaborately developed by Paracelsus. This too Browne echoes and understands in terms of his own scientific experiences. The human body is "that bold and adventurous piece of Nature, which he that studies wisely learns in a *compendium* what others

labor at in a divided and endless volume." The compendium derives from a view of the cosmos as an arrangement of horizontal levels, connected by innumerable correspondences. Among these levels—the supernatural, the universe, the commonwealth, man, and the lower creation—the occult sciences exploited the correspondences between man, the universe, and the lower creation. By these, sympathies and antipathies (human remedies and poisons from animal, plant, and mineral bodies), alchemy, physiognomy, and astrology were explained. Man, says Browne, recapitulates the five kinds of existence—mineral, vegetable, animal, human, and spiritual—and so man is truly a microcosm, an epitome of the creation. "Man is the whole World and the Breath of God; Woman is the Rib and crooked piece of man." Browne can study all the wonders of nature in the "cosmography" of himself. The cosmography of man was explicable in terms of Browne's biology. God, he says, beholds the world in its "Epitome," in the microcosm of man or in the seed of a plant. The microcosm is an epitome, and so is Browne's Idea. The latter lends itself as a concrete instance, one scientifically investigated by Browne, of the concept of epitome or microcosm, pivotal in occult doctrine. The epigenetic Idea in the seed and the pan-genetic Idea in the body both are epitomes. Each part of the seed recapitulates the body and soul of the whole individual; each part of the body also does so, containing as it does "the Idea of the whole." Browne could well appreciate the germinal concept in Paracelsus' system of thought, that each thing is a microcosm because it contains all substances.¹⁸ With the aid of his science he could thus implement the old rationale of magical faith, as well as improvise a new one.

In the body and soul of man the concepts of the microcosm and of the chain of being find a common center. Man is an "amphibious piece between a corporal and a spiritual essence," the crucial link between matter and spirit. The spiritual essence

is adumbrated by the corporal, the divine soul by the biological, the rational soul by the sensible and vegetal. Browne's great scientific interests were anatomy and physiology, body and soul, whose interdependence he could as little ignore as could Aristotle, who viewed body as the potentiality which soul transforms into actuality. The amphibious nature of man, his doubtful middle state between God and beast, accounts for Browne's dualism. It also accounts for his dilemma on the nature of the soul. As a scientist, he was led to seek the soul's relation to the body, to trace the implications of that subtle knot which makes us man. As a Christian, he talked of "that immortal essence, that translated divinity and colony of God, the Soul." On the one hand, he observes that in his study of anatomy, "amongst all those rare discoveries and curious pieces I find in the Fabrick of Man," he misses something when he comes to the brain. He can find no more there than in the cranium of a beast; he can find "no Organ or Instrument for the rational Soul." This is, he suggests, no inconsiderable argument for its inorganicity. On the other hand, he makes the thoroughly Aristotelian observation, "Nor, truly, can I peremptorily deny that the Soul, in this her sublunary estate, is wholly and in all acceptations inorganic; but that for the performance of her ordinary actions there is required not onely a symmetry and proper disposition of Organs, but a Crasis and temper correspondent to its operations." The human soul is organical, yet autonomous. It entered the body in the seed of the parents, yet one cannot say how. To symbolize his dualism and the mystical dilemma of the unity and duality of the soul, Browne resorts to his mystical quincunx. The double figure of Plato—the Greek χ and the circle described by its revolution—represents the soul's divinity, its corporality, and the harmony of those two. "The circle declaring the motion of the indivisible soul, simple, according to the divinity of its nature, and returning into it self; the right lines respecting the motion

pertaining unto sense, and vegetation, and the central decussation, the wondrous connexion of the severall faculties conjointly in one substance." The Christian can find some comfort, or at least clarification, from the scientist. The indivisible soul is somehow related to the sensible and vegetal soul. As a Christian, Browne's tendency to monism is strong. As a scientist, Browne's interest in the body contrasts with the *contemptus mundi* not only of medieval idealism, but with that of such a near contemporary as John Donne, who in his *Progress of the Soul* criticizes the new scientific inquiries into the nature of the body, that "province packed up in two yards of skinne," in which the soul lives "bedded and bathed in all his ordures." ¹⁴ For Browne the ordures have both a biological and a metaphysical significance.

Browne's concept of body and soul brings to a focus his divided and distinguished worlds, the natural and the supernatural, his rationalism and his mysticism, his dualism and his idealism, above all, the influence of his science upon his imagination. Science limned a visible picture of the invisible. It taught him to "suck Divinity from the flowers of Nature." It led him to speculate on the ways of God and the meaning of life. His scientific experiences were only contributing elements, together with many inherited concepts, to his philosophical outlook. But they were major elements, assimilated through painstaking trial, through close daily application in library and laboratory. From the routes of science Browne's imagination could encompass many of his inherited concepts, concepts not ordered by that imagination into the pattern of a universal harmony, but yet together sounding a dominant idealistic, Christian tone. The quality of that tone was determined by that science. From the minutiae of scientific experiences Browne could rise to the generalizations of philosophy and to the conclusions of faith, could pursue his reason to the altitude of divinity. The sensible and vegetal souls, cruder manifestations of spirit, enmeshed in flesh, confounded though immortal, whose func-

tioning was susceptible of laboratory analysis, could adumbrate the divinity of the human soul. The "vital principles" in the great circulation of nature, the panspermatic vitalism rolling through all things, could adumbrate the divinity of the world soul. The Idea in the seed could become an analogy for the Ideated Man in the intellect of God. The invisible fire of nutrition and respiration could furnish an approach to the nature of life's flame, of starry light, and of Holy Light. The duality of man's and the universe's primitive materials, the Idea immersed in semen, the dispersed seminalities in chaos, could lead to an understanding of the nature of being, of the general interpenetration of matter and spirit. Legions of zoological and botanical phenomena could, for Browne the naturalist, add personal significance to the conventional concepts of nature as a reasonable order and nature as the art of God: the "curious mathematics" of the bee's anatomy could shadow the "mystical Mathematics of the City of Heaven"; the whole world and creatures of God could be, like music, a sensible fit of that harmony which intellectually sounds in the ears of God. From the vantage of the natural, not only the supernatural but the preternatural could also be rendered reasonable; not only God and his miracles, but the Devil and his magic could be rationalized by science, as the operation of causes which are yet "in discovery" or as the operation of correspondences among epitomes realizable in the Ideas of Browne's biology. Generally, as Browne himself was well aware, the hieroglyphs of nature, such as scientific data, when grasped by sense and interpreted by reason, could lead to an imaginative reconstruction of the articles of faith. "An easie Logic may conjoyn Heaven and Earth in one Argument." ¹⁵ The lower links in the great chain of being could lead to the higher. In contemplation of created things, by steps he might ascend to God. (Browne's empiricism could support his rationalism and both could fortify his mysticism.)

The influence of Browne's science on his imagination was thus

indirect. From it he did not evolve a new philosophic structure. He presents us with anything but a coherent pattern. This failure of induction or synthesis is a weakness he shares with all but the piercing intellects of the ages. But in so far as he assimilated the convenient and conventional concepts of his milieu, he reaped a profit from his scientific activities. For these could act as catalysts within his compound of ideas. With their aid his imagination could more intensely realize his rich intellectual inheritance, could more vividly project it in the art of his prose.

(The reflection in Browne of an intellectual heritage is kaleidoscopic. The modern moral problem of men's economic, political, and social relationships, though it was then coming to the foreground of public consciousness, is outside his ken. But for this, the reflection in Browne is a fair sample, in a receptive and quick, but not greatly philosophic mind, of the seventeenth-century medley of opinion. In a way, it is more than a fair sample, and Browne never pretended to be a greatly philosophic mind. His adventures of the mind are impetuous, even quixotic; his is the play of a picaresque imagination. If there is lack of pattern, there is lack neither of variety nor vivacity. If he is content with his bits of philosophy and superstition, so may we be. As part of his meditative equipment, he possessed a free whimsey. It may be that he was so spontaneous, if measured, an artist precisely because he was so uneven a philosopher. It may be that his philosophical casualness was a necessary condition of his lyrical whimsicality. In any event, for his gratuitous grace, as for all art, we are thankful. The weakness of his philosophic imagination is more than recompensed by the bursts of argenteous revelry from his artistic imagination.)

III. THE ART

7. *The Artistic Imagination*

BUT HOW, finally," Matthew Arnold asks in the climactic question of his "Literature and Science," "are poetry and eloquence to exercise the power of relating the modern results of natural science to man's instinct for conduct, his instinct for beauty?" He answers, disappointingly, that he does not know *how* it is done, but that he does know it *is* done. The disappointment is perhaps inevitable. Probings into the nature of the artistic imagination have not reached very deep; at most we compare endings with beginnings. In Browne's case the opportunity to study the correlation, by his imagination, of his science to his moral and esthetic "instincts" is particularly inviting because throughout his writings the beginnings are in such obvious juxtaposition to the endings; the unfinished and semifinished materials of his learning and science bulk large around the pieces of finished art. This diversification of material is a reason for our distinction between the philosophic and the artistic imagination.

The nature of the artistic imagination has been studied recently from many points of view, in works so diverse as those of June Downey, John Livingston Lowes, and F. C. Prescott.¹ The concept underlying these various approaches is that imagination is a correlating, creative activity. As we are here concerned not with Browne's esthetic theory but with his artistic product, his artistic imagination will be examined in the light of this more recent, fruitful concept rather than in the light of Renaissance theories of the imagination.

The philosophic imagination correlates ideas, usually certain ultimate and recurrent ideas on God, nature, and man. The artistic imagination may use any of these ideas; or any others,

but must relate intellectual to sensuous experience, the abstract to the concrete. The imagination, philosophic or artistic, is synthetic; it functions by a process similar to that of logical induction. The greatly philosophic imagination binds experience, correlates ideas and sense data—like those of science. The artistic imagination must be great, must bind experience, must correlate ideas and sensations, translating the former in terms of the latter, transforming ideas from pale, conventional responses to vivid, natural experiences. The imaginative process which arrives at a generalization, or any philosophic view, and that which arrives at a metaphor, or any artistic embodiment, are similar. In the one case we call it induction; in the other, creation. The difference between the philosophic and the artistic imagination is one of degree. The more stimulating ideas are related to sensations, are expressed as poetry and rhetoric; the others are left as cold philosophy, as propositions geometrically rather than personally realized. "Grau ist alle Theorie," remarked Goethe, but for a Keats, not to mention a Michelangelo or a Beethoven, ideas can become objects of taste or touch, of sight or sound. The artistic imagination encompasses the spice and warmth, the color and melody of living. It must encompass these; the philosophic imagination may, and often does, omit them. Perhaps this is Arnold's meaning when he says, in his essay on Wordsworth, "Poetry is the reality, philosophy the illusion." The philosophy we elicit from the poem is a gray shadow which leaves the reality behind. Finally, when the greatly philosophic imagination is also artistic, as in Plato and Lucretius, or when the artistic imagination is also philosophic, as in Dante and Milton, the furthest correlation or induction or synthesis has been made among intellectual and sensuous experiences. In Browne's case we see three stages of integration, represented by his science, his philosophy, and his art. Though he is not equally great in all, he does exhibit, in a distribution that is rare for his time or for any time, the mental

processes that attained great results in different types of men, scientists, philosophers, and poets.

It is necessary to make these distinctions in discussing Browne's imagination because his philosophy and his art are so close. Certain concepts in his milieu touched a chord within him, which sounded in the "hours endless and singing" of his prose. Some of these concepts, such as those of the Idea, of life, and of death, were for him scientific as well as poetic. When this was so, the scientific influence upon his imagination was direct as well as indirect: the science provided him, through its philosophic concepts, with thematic material, in addition to stimulating him, through its laboratory data, to a more vivid realization of conventional themes. The laboratory data could be integrated with scientific concepts and these concepts could reach, in higher stages of integration, through his philosophy to his art.

As a philosopher, Browne can at times be artistic; as an artist, he is always philosophic. Santayana makes the convenient distinction between three levels of poetry, that of mere sound and virtuosity; that of fancy, observation, and passion; and that of "creative reason." The artistic imagination uses the sensuous material of words, the sensations of persons and places, and by creative reason elicits from all these new wholes. Browne's art is that of "creative reason."² He loses himself neither in words nor in sensations, but with these builds in us new understanding and appreciation. His themes are spacious and meditative: of life and death, time and eternity; they are set to a music which is formal yet sprightly, what De Quincey once happily characterized as a polonaise.

What do we know about Browne's personal experiences that would explain his art, the expression of certain ideas by his imagination in certain sensuous terms? With his personal scientific experiences in library and laboratory, those of his profession, "whose study is life and death," all of which led him naturally

to his great themes, we are familiar. Their relation to his art will be our subject in this section. We shall see how, as in the case of his philosophic imagination, his science enabled Browne to assimilate, to convert to the uses of his peculiar art, certain stock themes of his day. The influence of science upon Browne's artistic imagination, as compared with its influence upon his philosophic imagination, involves a deeper penetration into the recesses of his being, a fusion of science with experiences which determine not only thought, but tone and feeling in a work not only intellectual but artistic as well. These other, less articulate but equally meaningful, personal experiences upon which he drew are by their nature more difficult to ascertain. The artistic imagination works upon the little, unremembered acts of our daily life. Its materials are harder to quarry from printed pages, even those of a spiritual autobiography such as the *Religio Medici*. What we can grasp is only general and still elusive, but it may serve to sample those hidden veins in the depths of Browne which, combined with his more tangible scientific experiences, resulted in his great art.

(His temperament was "Melancholy and Contemplative," he tells us, his conversation "austere," his behavior "full of rigour, sometimes not without morosity." He liked solitude, being "no way facetious, nor disposed for the mirth and galliardize of company." He was ever one for whom the bell tolls, with a Puritan sense of the imminence of death. "For the World," he observes, "I count it not an Inn but an Hospital, a place not to live, but to dye in." Yet he was by no means dour. He loved laughter, life, and beauty. His sense of humor was quiet and delicate. In his dreams, he tells us, he could compose a whole comedy and laugh himself awake. He regrets the opinion that Christ never laughed; only so could the Savior have given "the assurance of his humanity unto men." Of his own humanity we can have no doubt.) His early life was to him "a miracle of

thirty years, which to relate were not a History, but a piece of Poetry, and would sound to common ears like a Fable." He was "the happiest man alive . . . more invulnerable than Achilles." He saw life steadily and saw it whole, "averse from nothing," had gust for all foods, all conditions of life, all climates, all nationalities, all religions, all nature, all learning. He would not entertain a base design for the Indies, could think ill of no man, and loved his friend before himself. "Naturally amorous of all that is beautiful," he was especially moved by music. "Whoever is harmonically composed delights in harmony; which makes me much distrust the symmetry of those heads which declaim against all Church-Musick." (Even popular songs, "vulgar and Tavern-Musick," struck in him "a deep fit of devotion.") His love for beauty and music is associated by him with his deep, mystical religious devotion. He could never hear the Ave Mary bell without a feeling of elevation. There is in music something of Divinity, "more than the ear discovers"; it is indeed a "sensible fit of that harmony which intellectually sounds in the ears of God." ³

Even these few hints, taken largely from the *Religio Medici*, written when Browne was thirty, tally with our impression of the poet who at fifty-three published the *Urn Burial*, a poet who had developed the industry of a scholar, a poet the surface of whose life was by that time cluttered with the academic urgencies of learning and science as well as the practical urgencies of family and profession. Below that surface still lay the center which illumines the memorable art of Browne, a personality meditative, witty, full and harmonious as music.

One only regrets that not more of Browne was embodied in a crystallized and sustained work of art, that the vein of imagination was not more penetrating in the large body of his learning and science, that the exercise of Browne's artistic, like that of his philosophic, imagination was so intermittent, not only in works

like the frankly aphoristic *Christian Morals*, the tangled *Garden of Cyrus*, the digressive *Pseudodoxia* and *Letter to a Friend*, but in the *Religio Medici* and the impromptu *Urn Burial* as well. In these great works it becomes more apparent that much of Browne is left out of much of his writing.⁴ At lucid intervals Browne's imagination reveals his buried life in his art, with its meditation upon the themes of life, death, time, and eternity; a plain song darkened with brooding thought, lightened with subtle irony, embroidered with encyclopedic learning, and ordered in monumental music. This still and haunting center is now our subject. We shall examine the nature of Browne's art; we shall note the kind of influence science has upon it and the kind it does not have.

8. Prose Art

THE RHETORICAL TRADITION that lay behind Browne's prose has been carefully studied—the formal Ciceronian style, the informal anti-Ciceronian style, the elaboration of figures, the variations in prose rhythm.¹ George Saintsbury, N. R. Tempest, and J. N. Cline have concerned themselves particularly with this aspect of Browne's writing.¹ Such an analysis of Browne's stylistic devices will not be here attempted. However, a descriptive analysis of Browne's prose art, an examination of its leading qualities—the esthetic distance or sense of perspective, the aphoristic dexterity, the wit, the paucity of visual imagery, the peculiar musical expressibility of its themes—will furnish a basis for evaluating the influence of science upon his imagination. In order to provide a context in which to judge the contribution of Browne's science to his art, the qualities which lend that art its unique character will now be considered.

The first sentence Browne ever published, in the preface to the *Religio Medici*, exhibits the attitude and tone which distinguish his art; it is an attitude detached and deliberative, as of one turning the globe around for his recreation; it is a tone both serious and ironic. "Certainly that man were greedy of Life," he observes, "who should desire to live when all the world were at an end; and he needs be very impatient, who would repine at death in the society of all things that suffer under it." His theme is death, a theme which allows him to achieve esthetic distance, and with that a new sense of proportion, an Olympian perspective on life. It is the perspective of a physician and scientist as well as of a poet and philosopher, of one close to the sources of life and death, of one who has experimented and

meditated, whom the laboratory specimens and the fossils of this world have brought closer to the other world. William Hazlitt, whose criticism grasps most clearly this Prospero-like attitude and tone of Browne, remarks that "he looks down on sublunary affairs as if he had taken his station on one of the planets. The Antipodes are next door neighbors to him and Dooms-day is not far off . . . he applies the telescope of the mind to distant bodies."² The altitude of Browne's flights we have taken from the vantage of his science. "Elysium is as far as to the very nearest room," and for Browne that room is often his laboratory. His sense of perspective derives from a familiarity with celestial objects, and that familiarity he achieved partly through his scientific experiences. We have seen how, starting with a routine observation, his imagination would suddenly, as in a dream, open upon new vistas, how the "atom" of duckweed could lead to the great circulation of nature, the seedling to the mind of God; how the phosphorescence of the glowworm could lead to the flame of life, to the burning of a star, to the bright essence increate.

Browne's Olympian attitude is often telescopically conveyed through aphorisms. The sudden juxtaposition of ideas characteristic of his scientific imagination is the mark of a witty as well as a meditative mind. From the perspective of the grave, of the last day, and of the next world, this world is brought into a new focus for him. This focus is often exhibited in pointed expressions: "But man is a noble animal, splendid in ashes, and pompous in the grave." At the last day, "some graves will be opened before they be quite closed, and Lazarus be no wonder." Good men, innocent in all their personal relationships and hence without enemies, upon entering the next world make "no commotion among the dead." In seventy or eighty years a man may have a deep gust of the world, know what it is to be a man and even to be forgotten—an old man "may go out of the World

less related than he came into it." Even so, "the long habit of living indisposeth us for dying." Hope for earthly fame now is a superannuated piece of folly, in a rapidly decaying world: "'Tis too late to be ambitious." Time and space are telescoped in the exalted whimsey which concludes Browne's most whimsical work on the quincunx, one which may well have been in Hazlitt's mind when he characterized Browne as close to the antipodes and to doomsday:

To keep our eyes open longer were but to act our Antipodes. The huntsmen are up in America, and they are already past their first sleep in Persia. But who can be drowsie at that howr which freed us from everlasting sleep? or have slumbering thoughts at that time, when sleep itself must end, and as most conjecture all shall wake again? ³

What a reason, as Coleridge remarked, for going to bed at midnight, that if we did not, we should be acting the part of our antipodes!

With Browne's esthetic distance and aphoristic dexterity is associated his tone of serious irony. It is in somber play that he turns the globe around for his recreation; a somber sense of humor arises from his sense of perspective. This is especially evident in his musings on time and death in the *Urn Burial*. A quiet irony, like that of the gravediggers' scene in *Hamlet*, hovers over this work. The first sentence of the dedication has it: "When the Funerall pyre was out, and the last valediction over, men took a lasting adieu of their interred Friends, little expecting the curiosity of future ages should comment upon their ashes. . . ." Irony is implicit in the relation between death and time, between the comfortable expectation of the earth's shelter—quietly fulfilled under the drums and tramlings of three conquests—and the recent rape of the frail jars of human dust, torn up with pick and shovel, exposing again to the noises

of the world those thin walls of clay which, also ironically, had already outworn all the strong and specious buildings above it. The disclosures of the urns have "left unto our view some parts, which they never beheld themselves." "But who knows the fate of his bones," Browne asks, "or how often he is to be buried?" Hamlet observed how imperious Caesar might stop a hole to keep the wind away, and Browne how Mizraim cures wounds and Pharaoh is sold for balsams. With startling abruptness, Browne inserts the following sentence, standing as a solitary paragraph, in monumental mockery, among his antiquarian notes on burial customs: "To be gnaw'd out of our graves, to have our sculs made drinking bowls, and our bones turned into Pipes, to delight and sport our Enemies, are Tragical abominations, escaped in burning Burials"—a mockery intensified by the checkered history of Browne's own skull, ripped from its resting place in 1840 and "commented upon" in the public museum by the curiosity of succeeding generations.⁴

Browne's somber wit and aphoristic dexterity may both derive from his sense of perspective, and his sense of perspective from his familiarity with celestial objects—a familiarity achieved partly through his scientific experiences; he may have become acclimatized to the rare altitudes of his meditations through the medium of science; but how does he succeed artistically in impressing us with his insights and intuitions? Is there something more than the happy juxtaposition of ideas? If the artistic imagination binds intellectual to sensuous experience, what are the sensuous qualities of Browne's prose; to what extent is the concrete symbolism of imagery and music evident in his literary art?

In spite of its spirited play, Browne's imagination does not depend upon visual imagery generally, nor therefore upon scientific imagery specifically, to communicate his peculiar attitude and tone. The sensuous element in Browne's art is audi-

tory rather than visual. As a consequence, his rich fund of scientific material is not habitually quarried for comparisons. Browne does depend upon metaphor, or rather symbolism, for an instrument of thought. Philosophically, he sees all the phenomena of nature which he studied scientifically as symbols of the mind of God. These symbols, or "hieroglyphs," are in the realm of things what metaphors are in the realm of speech, concrete or sensuous representations of spiritual reality.⁵ As an instrument of art, rather than of thought, metaphor plays a minor role in his work. We may read far in the *Religio Medici* or the *Urn Burial* before encountering a memorable image. His stores of science are not directly exploited for this purpose. What imagery these works do reveal belies what we know to have been his chief interests. Generally, Browne resorts to the abstract patterns of mathematics and astronomy: "For the lives, not only of men, but of Commonwealths, and the whole World, run not upon an Helix that still enlargeth, but on a Circle, where, arriving to their meridian, they decline in obscurity, and fall under the Horizon again." Or again: "Since our longest Sun sets at right decensions, and makes but winter arches. . . ." He is fond of the circle: "Circles and right lines limit all bodies, and the mortal right-lined circle must conclude and shut up all." "Those unstable Judgments that cannot consist in the narrow point and centre of Virtue without a reel or stagger to the circumference." His few biological images in these most characteristic works of his are not always interesting: "I am no Plant that will prosper out of a garden." A somewhat better one, deriving from his horticultural interests: "It is a happiness to be born and framed unto virtue, and to grow up from the seeds of nature, rather than the inoculation and forced graffs of education." To convey our embryonic philosophy concerning our state in the next world, he more than once uses the image of the womb: "A Dialogue between two Infants in the womb" concerning the

state of this world, might handsomely illustrate our ignorance of the next. . . ." ⁶ The few telling images in Browne's most brilliant prose, that of the last chapter of the *Urn Burial*, are from ordinary life. It is no unhappy stupidity by which we forget the outrages of Fortune: "Afflictions induce calosities; miseries are slippery, or fall like snow upon us." Avarice now consumes the Egyptians whom time has spared: "Mummie is become Merchandise, Mizraim cures wounds, and Pharaoh is sold for balsams." By the damned on the last day "annihilation shall be courted." "Oblivion is not to be hired." Human history is short: "old Families last not three Oakes." It will be noted that these images are not predominantly visual. Often they are obscured, a type that has been termed "the sunken image." ⁷

Browne's best scientific imagery is restricted largely to the *Christian Morals*, a work not characteristic of his best art. A sequel to the *Religio Medici*, written by an old man, cold and didactic, the *Christian Morals* has evoked anything but enthusiasm from Browne's readers. It does, however, reveal an increasing utilization, toward the end of Browne's life, of his science by his artistic imagination. In the *Christian Morals*, Browne's biology has a direct influence upon an imagination which has lost some of its earlier glow. To enforce his maxims, he culls his anatomy and physiology: "A man may come into the *Pericardium*, but not the Heart of Truth." His investigations into "denigration" in combustion and disease, which he brought to bear on the blackness of negroes, underlies his illustration that a man who grows old in sin "makes himself a Negro in the black Jaundice." The central fire of traditional physiology furnishes a comparison: "Flame not like the central fire which enlightneth no Eyes, which no Man seeth, and most men think there is no such thing to be seen." Again it will be noted that the visual element is not strong, a feature almost paradoxically illustrated in the last image, which depends upon the invisibility

of the flame to enforce its point. However a strongly visual, and rather Swiftian, image did result from Browne's habitual use of the magnifying glass. Faces look uniform to our eyes, he says, but how they look to animals whose more piercing sight is able to discover the inequalities of our skin is not without good doubt: "Affection should not be too sharp-Eyed, and Love is not to be made with magnifying Glasses . . . to discover those uncomely asperities, which make Oyster-shells in good Faces, and Hedghoggs even in Venus's moles." ⁸

Since the materials of science lend themselves peculiarly to the uses of the visual imagination, as in the art of a Donne or a Milton, the comparative infrequency of visual imagery in the art of Browne, considering his superior fund of such scientific materials, is especially noteworthy. In the great work of his early and middle years, the most common scientific images are mathematical and astronomical, by nature abstract. The imagery from his other sciences is obscured, or "sunken." Browne's imagination was not predominantly visual, and hence the kind of influence his science had upon it could not be direct, could not be primarily that of source material for the equations of metaphor.

The sense experience into which Browne's artistic imagination translated his themes was that especially of sound. Keats puts this matter well in one of his letters: "Axioms in philosophy are not axioms till they are proved upon our pulses." That Browne's axioms were so proved is revealed in the rhythm, tone, and melody of his prose. His correlation is more subtle, and less definable, than that between ideas and pictures. Music by its nature eludes the categories of language. It is not for that reason any the less evocative, either for the author or for his reader. As the supreme lyrical art, music catches the thought and feeling, the insights and intuitions of its creator. Plato spoke of philosophy as a finer kind of music.⁹ No one understood this

marriage of reason and passion better than Browne himself. Music for him is intellectual, a cruder kind of Divinity. It reflects the intellectual beauty of the universe; it is a sensible fit of that harmony which intellectually sounds in the ears of God. T. S. Eliot has remarked that "poetry can communicate before it is understood."¹⁰ The philosophical insights and the mystical intuitions of Browne are communicated partly through the symbolism of his music. Browne's prose art is a sensible fit of that harmony which intellectually sounds in his imagination. The distinguishing feature of his artistic imagination is perspective, a sense of new proportions arising from his familiarity with celestial objects. He applies, in Hazlitt's phrase, the telescope of the mind to distant bodies. The march of his pen is over the great divisions of geography and chronology. The impressions of great distances, especially in time, is an auditory and kinesthetic, that is a musical, as well as an intellectual one in Browne's art. Milton's imagination has also been described as telescopic. But with Milton the impression is spatial as well as temporal, visual as well as auditory. With Browne the nice question does not arise, as it does with Milton: how much of the impression is owing to visual imagery and how much of it is owing to music? In so far as the cosmic sweep of Milton is an effect of his rolling periods, he compares with Browne. De Quincey observed that nowhere but in Browne can one find music so Miltonic, "an intonation of such solemn chords."¹¹ Both Milton and Browne, significantly, were deeply moved by church music. In both, Latinisms and classical names are long drawn out in linked sweetness. Browne's cosmic sweep is a Miltonic intonation of solemn chords.

(The sensuous and the intellectual, though one in pure music, are two in language. In great literary art, such as Browne's, the two tend again to become one. The musical impression of speech must reinforce the meaning, or, as Pope more happily put it,

the sound must seem an echo to the sense. Music has a subtle pantomime of its own; its gestures are auditory. Auditory gestures, communicating insights and intuitions, characterize all intense poetry and prose. Such program music pervades Browne's literary art. Though a prose writer like De Quincey, much influenced as he was by Browne, can afford illustration, the analogies to this aspect of Browne's art are much clearer in poetry. "Poetry," Santayana has said, "is speech in which the instrument counts as well as the meaning—poetry is speech for its own sake and for its own sweetness." In Tennyson's "The Lotos-Eaters," when the stream

Along the cliff to fall and pause and fall did seem,
the sound does seem an echo to the sense. In Keats' line,

To thy high requiem become a sod,
the vowel melody rises up to the caesura, then falls, an exact auditory image of the meaning. Pope's lines, set out for display, make his precept almost ludicrously clear:

When Ajax strives some rock's vast weight to throw,
The line too labors, and the words move slow;
Not so, when swift Camilla scours the plain,
Flies o'er the unbending corn, and skims along the main.

In *Paradise Lost*, the impression of the smooth flow of time is conveyed by the sound as much as by the sense:

From morn to noon he fell,
From noon to dewy eve, a summer's day.

The sense of Browne is characteristically that of time, in its various relationships to man. His temporal themes lend themselves expressly to the uniquely temporal symbolism of music. Thus the very best of Browne, the first five paragraphs of the last chapter of the *Urn Burial*, contains the following themes,

resounding in his mighty lines: the slow march of time since the proprietaries of these bones were laid in the earth; the steady pulsation of time during the minutes of our life; the proportion of the extensive past to the paltry future in the present decay of the world; the proportion of the particle of all earthly time to the deserts of vast eternity. The opening of the chapter presents the first theme:

Now since these dead bones have already outlasted the living ones of Methuselah, and in a yard under ground, and thin walls of clay, out-worn all the strong and specious buildings above it; and quietly rested under the drums and tramlings of three conquests; What Prince can promise such diuturnity unto his Reliques, or might not gladly say,

Sic ego componi versus in ossa velim.

The current arithmetic of the years is measured by the defacement of time's fell hand, by the historical divisions of conquests—Roman, Danish, Norman—the secular noises of victorious entries and the hectic yet gradual assimilation of a new race interrupting at vast intervals the quiet repose of the urns. This is the sense, which can be paraphrased; the sound cannot be. When sounded to the inner ear, or better when sounded aloud, the passage reveals the marriage of Browne's content and form, his thought and feeling and music. The sense of proportion between a lengthening past and a diminishing future, of time categorically blocking the prospects of humanity, is aptly echoed in a passage when, after two stately sentences, we are stopped by the quick rhythm and wit of the last one: "And therefore restless inquietude for the diuturnity of our memories unto present considerations, seemes a vanity almost out of date, and superannuated peece of folly. We cannot hope to live so long in our names, as some have done in their persons, one face of Janus holds no proportion to the other. 'Tis too late to be ambitious." This

brilliant paragraph on death and time, on the decay of the world and the insignificance of worldly time, is audibly sustained to the last resounding period:

To extend our memories by Monuments, whose death we daily pray for, and whose duration we cannot hope, without injury to our expectations, in the advent of the last day, were a contradiction to our beliefs. We whose generations are ordained in this setting part of time, are providentially taken off from such imaginations. And being necessitated to eye the remaining particle of futurity, are naturally constituted unto thoughts of the next world, and cannot excusably decline the consideration of that duration, which maketh Pyramids pillars of snow, and all that's past a moment.¹²

Browne's music informs his content; it is a sensuous symbol for the thought and feeling evoked by his themes. The program music of his prose counts as a subtle instrument in its meanings. The sensuous and the intellectual—music, intuition, and insight—become one in his prose art. His sense of time in its various relationships to man—in life and death, in history and eternity—is echoed in his sound. The themes of his art are a musical transmutation of the themes of his science. The materials for his music are those which he assimilated in his library and laboratory. Browne's axioms were well proved upon his pulses.

9. *Art and Science*

BROWNE'S AXIOMS were proved upon his pulses with the instrument of experimental science. In his great art the function of science was generative. It vitalized for him certain themes which became the leitmotifs of his symphonic prose. Themes which had staled in the public market were resuscitated in Browne's laboratory. Upon neither his philosophy nor his art did Browne's laboratory science exert a direct influence, since it did not become a basis for philosophic structure or for poetic image. The science served rather to personalize conventional meanings, to assimilate them to a personality which could then express them in its harmonies. What, then, were the bearings in his science of Browne's literary themes of life and death, of time and eternity?

Browne was much possessed by death. Its poetic associations which life and time, with the decay of the world, with resurrection and eternity, make it a focal theme in his art; its scientific associations with sickness and age, with length of life and manner of dying, with the chemistry of decay, make it a focal point in the relation between his art and his science. (The omnipresence of the theme of death in Browne's day, in religious, in philosophic, in artistic, and in literary tradition needs no emphasis: it is evident in such religious themes as medieval and Puritan eternal damnation; in such philosophical themes as Christian optimism and Stoic resignation; in such artistic themes as the Crucifixion, the agonies and jests of death in painting, sculpture, and household mementos and in the popular dances of death; in such literary themes as the ruins of time, mutability, and decay—not to mention the pathological horrors of later Eliza-

bethan drama. Browne's age was also much possessed by death; Donne, William Drummond, Burton, and Jeremy Taylor notably employed the theme. Donne is well known in his shroud, standing upon an urn in St. Paul's, painted as he wanted to be remembered, "with his eyes shut," as Walton tells us, "and with so much of the sheet turned aside as might show his lean, pale, and death-like face." Death became the subject of Donne's later poetry and of his greatest sermon, "Death's Duel." Browne's contemporary, Andrew Marvell, in "To his Coy Mistress" strikingly fused the themes characteristic of the *Urn Burial*. Much of the grist for Browne's artistic imagination was thus ready, down to the associations between time, life, death, mutability, decay, and eternity—associations developed through the sixteenth and seventeenth centuries by such writers as Spenser, Shakespeare, Raleigh, Donne, and Marvell.

(Browne's peculiar view, however, is that of physician and biologist.) This point he himself makes in introducing his own great work on the subject. "Beside," he says in the epistle dedicatory to the *Urn Burial*, "to preserve the living, and make the dead to live, to keep men out of their Urnes, and discourse of humane fragments in them, is not impertinent unto our profession; whose study is life and death, who daily behold examples of mortality, and of all men least need artificial *memento's*, or coffins by our bed side, to minde us of our graves." The spiritual aspect was for Browne related to the physical; he contemplated the mystery of eternity, and he scrutinized the bowels of corpses. The great facts of birth and death, the nature of life, its origin and its cessation, were in the limbo of his mind when he composed the *Urn Burial*. The same combination of art and science is evident in the very title of his first work, the *Religio Medici*. The great themes of Browne already appear there, and so does the physician's understanding. "I that have examined the parts of man, and know upon what tender filaments that Fabrick

hangs," he says, "do wonder that we are not always sick." Death is ever imminent; "we are beholding to every one we meet, he doth not kill us." The toll of the passing bell aroused in Browne not terror, but curiosity. Though not insensible to the dread and horror of death, there is no man, he says, who fears it less than himself. Bacon, who had also investigated death as a scientist, had said that men fear death as children fear to go in the dark. Browne's stoicism, like Bacon's, is reinforced by his science. His body, he says, is "as wholesome a morsel for the worms as any." Note the hard humor in his remark, "Death hath spurs, and carcasses have been courted." He peers into the abode of worms and pismires, as Pater has observed, "with boundless curiosity and no fear." His scientific curiosity produced a very different attitude from that of a Donne or a Taylor. He found nothing of what Taylor called "the loathsomeness and horror of a three day's burial." Donne had shuddered in fear at "the wormy circumstance of dissolution." Browne talks about "fresh decayed bodies" as though they were good laboratory specimens of the chemistry of decay, as indeed they were—specimens of Browne's one original scientific discovery, the fatty substance in the grave called "adicipere."¹ When Browne saw the skull beneath the skin, he saw it as poet and also as anatomist.

(The relations between death and life, decay and generation are close in Browne's biology.) Life arises quite literally from death, through the transmission of immortal "seminal atoms" from old to new organisms, from decay to generation. The grave can be a birthplace. Worms are bred out of the spinal marrow of men; degrees of putrefaction even become a measure of generation: "Animals of higher mischiefs" are produced "according to the advance and higher strain of corruption." Indeed, if there were only putrefactive generation, "the problem might have been spared, why we love not our lice as well as our children"; death and corruption would be the wellsprings of life,

"Noah's Ark had been needless, the graves of Animals would be fruitful'st wombs; for death would not destroy, but empeople the world again." Life can spring up everywhere from dead matter, wherever the sun happens to strike. The grave, the womb, and the chaos are all vitally related. The womb of nature is like her grave. The relation between generation and decay, the vivacious nature of putrefaction, underlies one of the finest passages, on life in death, in the *Christian Morals*: There is, says Browne,

only one enlivening Death, which makes Gardens of Graves, and that which was sowed in corruption to arise and flourish in Glory: when Death itself shall dye, and living shall have no Period, when the damned shall mourn at the funeral of Death, when Life not Death shall be the wages of sin, when the second Death shall prove a miserable Life, and destruction shall be courted.

The paradoxical, yet biologically valid, relationship between life and death stirred all the strange "conceit" of Browne's imagination, bringing a new incandescence to his prose, a fresh spice to his wit. It flowers even in the desert of the *Pseudodoxia*, in Browne's description of the end of the world: "For then indeed men shall rise out of the earth: the graves shall shoot up their concealed seeds, and in that great Autumn, men shall spring up, and awake from their Chaos again." ²

In his science Browne had many an occasion to remark the relations among time, life, and death—the relations which prove so significant in his art. How many pulses made up the life of Methuselah, were work for Archimedes. How our days become considerable like petty sums by minute accumulations, how and when they are terminated by death, were fundamental scientific questions. Death was only a counterfeit Lucina of life, falsely terminating it in insects and other creatures "who have not their

vitalities radically confined unto one part," and who can be reanimated within a day if put in the sun or warm ashes. The duration of life can be judged from the duration of embryonic development, on the assumption that nature observes regularity and proportion in her works. In long lived "the marks of age appear late: and when they appear the journey unto death cannot be long." The vital statistics of the Old Testament, of Methuselah and his compeers, provide Browne with biological and mathematical speculation on life, death, and time. The current arithmetic, which scarce stands one moment, is accelerated in the growth of early and in the decay of late life, in women as compared to men, in choleric as compared to sanguine constitutions. "If we begin to die when we live, and long life be but a prolongation of death," Browne can say with scientific as well as poetic certainty, "our life is a sad composition; we live with death, and die not in a moment." ³

Browne's science, blossoming sporadically in the *Pseudodoxia* and the *Christian Morals*, is incorporated with the art of the *Letter to a Friend* and the *Religio Medici*, and is metamorphosed in the art of the *Urn Burial*. *A Letter to a Friend upon the Occasion of the Death of his Intimate Friend* clearly illustrates the affinity between Browne's art and science. The *Letter* is a funeral elegy and a case history by the attending physician. The patient's "deliberate and creeping progress unto the grave" is depicted with a poet's sensibility and a scientist's objectivity. The unfinished and semifinished materials of Browne's science mingle characteristically in the *Letter* with the pieces of finished art. The ebbing of life in time, the physical symptoms of death, the difficulty of dying are insisted upon; many, though old, "seem to be drawn like Cacus's Oxen, backward, with great struggling and reluctancy unto the Grave." The teeth in Egyptian mummies afford pleasant digression, the moss on corpses—"the best I have seen was upon a woman's

skull, taken and layd in a roome after twenty-five years' burial." Even the ravages of consumption afford some pleasantry: "if the Bones of a good Sceleton weigh little more than twenty pounds, his Inwards and Flesh remaining could make no Bouffage, but a light bit for the Grave." As consolation, Browne sings the "incomium of Consumptions." A kind of physical beauty manifested itself in the approach of "soft death." He enforces the stoical view that by parting early, the consumptive parted well; he esteemed it enough to approach the years of his Savior, who so ordered his human state as not to be old upon earth. The length of life and the *atropos* of death again introduce temporal considerations. Browne "could not but take notice he died when the Moon was in motion from the Meridan, at which time an old Italian long ago would persuade me that the greatest part of Men died." Time of death may be related to the tides, to the ebb and recess of the sea; time of birth may be read from signs in one's hand, which Browne confesses "holdeth in my own." There are certain mortal times of year and certain mortal times of life. "The whole course of Time runs out in the Nativity and Death of things." The early death of his patient only anticipates the early death of the world; the theme of man's decay is, consolingly, transfigured in that of the world's decay: "And surely, he that hath taken the true Altitude of things, and rightly calculated the degenerate state of this Age, is not like to envy those that live in the next. . . ." ⁴

Browne's scientific and poetic sense evident in the *Letter* of the closeness between life, death, and time, of the relationship of the death of man to the decay of the world, were already communicated in his first work of art, the *Religio Medici*. There he communicated also his sense of the larger relationship between worldly decay and eternity, and revealed how his concept of eternity could be vivified through his scientific experiences. (As a physician's confession of faith, the *Religio* attempts to recon-

cile religion and science. In the first, and important, part it ranges over many topics: sectarianism, heresies, God, nature, providence, miracles, spirits, witches, the chain of being, man, the Creation, the soul, death, resurrection, eternity, Hell and Heaven, damnation and salvation. On the subject of death Browne speaks with the authority of a physician and the divination of a philosopher. At the age of thirty he had already felt death's cold hand. "Methinks I have outlived my self," he says, "and begin to be weary of the Sun." Death is best in an urn; in his calmer judgment, he commends "those ingenuous intentions that desire to sleep by the urns of their Fathers, and strive to go the neatest way unto corruption." As yet his own pulse had not "beat thirty years," but already he had studied and mused upon the relations among life, death, time, and eternity. Death could be found under a tree up any crooked way. Browne already knew upon what tender filaments the fabric of man hangs. As in the *Letter*, the transfiguration of death in the general annihilation is offered as consolation for its untimely visitation. Life, he says, is a burning of the vital sulphur of the parts. Though there be enough such sulphur in some, though the radical humour contain in it sufficient oil for vital combustion till seventy, he has perceived in some it gives no light past thirty:

Let them not therefore complain of immaturity that die about thirty; they fall but like the whole World, whose solid and well-composed substance must not expect the duration and period of its constitution; when all things are completed in it, its age is accomplished; and the last and general fever may as naturally destroy it before six thousand, as me before forty.

The death of the world and its *début* in eternity has for him interesting implications. Since the last and proper action of fire is but vitrification, it may be that at the last fire, as "some of our Chymicks facetiously affirm . . . all shall be christallized and

reverberated into glass. . . ." More probably the world will only burn down, and then "appear in a substance more like it self, its ashes." After its physical destruction, the world will continue to exist as Idea, as the reality which had for Browne been adumbrated in his scientific investigation. A plant burned to ashes seems utterly destroyed, but the forms are not perished. The eternal aspect of the world, like that of the reincarnated plant, which he affirms has been "made good by experience," is its ideal existence in the mind of God. The archetypal, generative Idea of the plant is the real plant, freed from physical vicissitudes. Thus can biological data interpret eternity, vivifying a meaning which can then serve the uses of his whimsey: "I was not only before my self, but Adam, that is, in the Idea of God. . . . And in this sense, I say, the World was before the Creation, and at an end before I was alive; though my grave be England, my dying place was Paradise: and Eve miscarried of me before she conceiv'd of Cain." This personal application is a striking example of how Browne's science functions as the medium through which his imagination can assimilate conventional concepts. There are other examples. "The artificial resurrection and revivification of Mercury," and "those strange and mystical transmigrations I have observed in Silk-worms," both illustrate "how that immortal spirit and incorruptible substance of my Soul may lye obscure and sleep a while within this house of flesh." These are the flowers of nature from which he sucks Divinity, in whose weaker glories he can spy some shadows of eternity. Having acquired personal significance in the context of his biological experiences, the mystery of eternity in which he loves to lose himself (time he can comprehend: "'tis but five days elder then our selves")⁵ together with the related themes of the decay of the world, death, resurrection, life, and time can become the material for the art of the *Urn Burial*.

In one of his later works, *A Letter to a Friend*, and in one of

his earlier, *Religio Medici*, has been evident the scientific background of the themes which receive their supreme expression in the ripe work of his middle years, *Hydriotaphia*, or *Urn Burial*. His masterpiece, like his other works, is by no means uniformly illumined by Browne's genius. It exhibits, in all but the last chapter, the characteristic medley of learning, science, and art. There are passages in it as unashamedly factual, as nakedly scientific as any in the *Pseudodoxia*. From one point of view it is the chef-d'œuvre of a seventeenth-century virtuoso. Sometimes it sinks under the incubus of its ostensible subject, antiquarianism. There is a *plenum formarum* of antiquities—rings, coins, chalices, bay-leaves, coals, skulls, teeth, ribs, thigh-bones—all found in graves. These are the minor monuments of time. They are so many incitements to discussions and digressions on the science and the antique pageantry of death: the absence of worms in graves, the susceptibility to decay and the inflammability of human bodies (the need of a large fire for "Hydropical Heraclitus," the piece of old boat sufficient for the incineration of Pompey), the few pounds of bone and ashes all men come to (the medicines and burning lights derived from carcasses, the "passionate prodigality" of drinking the ashes of one's relations), funeral wreaths and rites, the posture and orientation of corpses in the grave, Browne's own discovery of adicopere ("In an Hydropical body ten years buried in a Church yard, we met with a fat concretion, where the nitre of the Earth had coagulated large lumps of fat, into the consistence of the hardest Castle-soap; whereof part remaineth with us.") ° Coleridge aptly remarked that the gayest thing you shall meet with in the *Urn Burial* shall be a silver nail from a perished coffin top.

Then miraculously appears the fifth chapter, a miracle not of kind but of degree; the incandescence of Browne can glow in any of his pages, not least those of the first four chapters of the *Urn Burial*. But in the last chapter Browne's insights are

sharper, his intuitions deeper, and his music richer. His great themes are there made great: his sense of *life flowing and ebbing through time*: our days become considerable like petty sums by minute accumulations; adversity stretcheth our dayes, misery makes Alcmena's nights, and time hath no wings unto it; if the nearnesse of our last necessity, brought a nearer conformity unto it, there were a happinesse in hoary hairs, and no calamity in half senses; his sense of *the closeness among life, death, and time*: but the long habit of living indisposeth us for dying; long life is but a prolongation of death; the last day will make but few graves; to live indeed is to be again ourselves; the night of time far surpasseth the day, and who knows when was the equinox? our longest Sun sets at right decensions and makes but winter arches; his sense of *proportion between human decay and worldly decay*: we cannot hope to live so long in our names, as some have done in their persons; we whose generations are ordained in this setting part of time are providentially taken off from such imaginations; time that grows old itself, bids us hope no long duration; his sense of *proportion between worldly decay and eternity*: and being necessitated to eye the remaining particle of futurity, are naturally constituted unto thought of the next world, and cannot excusably decline the consideration of that duration, which maketh Pyramids pillars of snow, and all that's past a moment.

Browne's poetic intuitions are peculiarly temporal, and so are his intellectual interests: the dynamics of biology, the statics of death, the impact of history on ideas, the pursuit of antiquarianism—which ends with “the ancient of dayes, the Antiquarie's truest object, unto whom the eldest parcels are young, and earth itself an Infant.” (The art of the *Urn Burial* is a variation on the themes of his learning and science.) Here we are enveloped in the atmosphere of a Pharaoh's tomb, rather than that of a morgue; the *Urn Burial* cherishes fossils and retails

the post mortem of mummies. Death reverberates in the corridors of history and eternity. The temporal themes of human living and dying are magnified in the grander themes of geological and ancient history, of the world's decay and reincarnation. (The subject of the *Urn Burial* is death, its dimension is time, and its articulation is music.)

The inglorious data of Browne's science are almost unrecognizably transmuted in the symphonic glory of his art. Involved in this process of transmutation is a paradox: when the scientific data have been so completely assimilated that their rough, factual contours have faded, when they serve Browne as a lingering personal background, then their artistic influence is most effective; when, however, these scientific data, raw and unasimilated, are protruded in the foreground of his work, then they become blots upon the rich surfaces of his art—as in the *Letter to a Friend* and in the earlier chapters of the *Urn Burial*—or else they inhibit artistic utterance altogether—as so often in the *Pseudodoxia*.

The data of Browne's laboratory science should be distinguished from the other influences that acted upon his artistic imagination. They should be distinguished, in the first place, from another influence within Browne's science itself. This science consisted of philosophical concepts as well as of laboratory data. Such concepts as those of the Idea, of the microcosm, of life, and of death, concepts interpreted and refined for Browne in his reading as well as by him in his experience, evoked a more direct artistic response than did the experimental data. Such concepts became the themes of his meditations. The experimental data served a more menial function. They became agents or media for the intenser realization of the philosophical ideas that they supported. If we consider Browne's science, philosophy, and art as representing three stages of integration, three stages of synthesis by his imagination of the raw materials of his art,

then the indirect but pervasive influence of the experimental data becomes apparent: these data vitalized scientific concepts which could then be correlated with more inclusive philosophical themes; these themes, supported and enriched for Browne as a result of such correlation, could then, striking the sensuous core of his imagination, occasionally be graced in his lyrical prose. The experimental data constituted only one aspect of Browne's science, which science in turn constituted only one of many elements in the background of his art.

Behind Browne's art lay also those elusive personal experiences of a complex and delicate personality that we found hinted at in the *Religio Medici*, a personality balanced by diverse traits—the "melancholy and Contemplative" temperament, the gust for life, the mystical turn, the delight in wit, and the passion for music. In addition to these, another influence upon the art of Browne was, of course, the rhetorical tradition so strong in the sixteenth and seventeenth centuries: both the formal, oratorical, free-flowing, Ciceronian style used by Erasmus and Pico and the informal, paradoxical, aphoristic, anti-Ciceronian style used by Montaigne and Bacon.⁷ Such influences, temperamental and stylistic, are no less important than Browne's scientific data for an understanding of his art. It is only in the context of all the influences that the true significance of the scientific data emerges. The laboratory life of Browne was part of his intimate life. The stock themes and stock associations of time, life, death, mutability, decay, and eternity became Browne's themes when he read them in the terms of all his experiences. Blending with the more elusive experiences of a personality meditative, witty, full and harmonious as music, were those traceable experiences of the science in which he lived and moved the greater part of every day from his commencement at Oxford till his end at Norwich. This blend was the context which lent melody and color, musical and intellectual tone, to the pale cast of conventional themes. With

the aid of the more traceable learning and science and with that of the more elusive personal experiences, meaning was distilled from these conventional themes in the alembic of Browne's imagination. This meaning could then, with the aid of techniques inherited from rhetorical tradition, be communicated in the Olympian perspective, the brooding irony, the aphoristic dexterity, and the monumental music of his art.

Browne's science contributed, then, only one of many ingredients to the blend of his personality, only some of many experiences to the context of his art. The qualities of that art should not be taken as simply derived from the science, in a direct causal sequence. Browne's science was an objective study of life and death and time; his art a lyrical meditation upon these under the aspect of eternity. His study helped him to assimilate stock themes, which could then, in their newly intensified meanings, be uttered as lyrical meditations. Browne's scientific studies contributed thus indirectly to the distinctiveness of his style. Themes which were being treated by such contemporaries as Donne and Drummond—notably the theme of death in its varied associations with life, time, eternity, mutability, and decay—became peculiarly Browne's partly because of his medical and biological background. This background, with the artistic individuality to which it contributed, is evident in Browne's earlier and his later work, in the *Religio Medici* and the *Letter to a Friend*, as well as in the masterpiece of his middle years, the *Urn Burial*. The author of the *Religio Medici*, one whose most pertinent study is life and death, knows well upon what tender filaments the fabric of man hangs. Life is for him a burning of the vital sulphur of the parts; death is "enlivening," making gardens of graves; the decay of the world is a last and general fever; its eternity is prefigured for him in the Idea of a plant resurrected from its ashes. The *Letter to a Friend* strikingly combines the scientific and the imaginative aspects of the theme

of death, the physical symptoms and the philosophic consolations, mortal and temporal considerations. (The *Urn Burial* revels in crude fact, in an enthusiastic display of ribs, skulls, teeth, corporal inflammability, and decay.) The themes here too lie embedded in the scientific materials with which they have in Browne's experiences been associated. These familiar themes, in their familiar combinations, constitute the material of the great chapter. By the paradox of transmutation, the scientific bearings have, however, in the great chapter become obliterated. But though the scientific encrustations have for once disappeared from Browne's art, the extensive biological background behind this chapter may be inferred from the familiarity both of the themes and of their combinations.

Browne's science, pervading his routine as physician and as student, meeting him at every turn in his house and garden—his "paradise and cabinet of rareties"—became indeed, if we may judge from his letters and notebooks, the substance of his daily life. The materials of his library and his laboratory—the philosophical concepts and the experimental data—affected the themes of his great art both directly and indirectly: they provided him with topics for his meditations and with concrete personal instances in terms of which to interpret the larger, conventional themes. To the extent that these themes characterize Browne's art, he has imaginatively profited from his science. To the extent that other qualities also characterize his art—wit, aphoristic dexterity, and music—we must look elsewhere for the sources of Browne's imaginative power.

Upon both his philosophy and his art, then, the influence of Browne's laboratory science was indirect. Just as his imagination did not directly correlate his scientific data to weave an original philosophic pattern, so it did not project these data in striking poetic imagery. This science served as a personal medium through which inherited ideas and themes could be absorbed from the

philosophic and artistic milieu. Such was the imaginative influence on Browne of his great learning, of his constant research, completing his outfit as a poetic visionary, stirring all the strange "conceit" of his nature to its depths.)

"What time the persons of these Ossuaries entred the famous Nations of the dead, and slept with Princes and Counsellors, might admit a wide solution." That day in the 1650's, in a sandy field of old Walsingham, which discovered these persons again to the secular world, or at least some parts of them which they never beheld themselves, should be memorialized. Browne was "hinted by the occasion" to create the *Urn Burial*. It was for such casual rein given to his imagination, for the luster in all the rich array of his prose, even more than for the regular exercise of his learning and science, that he was raised to the natural peerage of his day, to his "Nobility without Heraldry." As to our day, his own observation applies in full, that having made as good provision for his name as he has done for his relics, he has not so grossly erred in the art of perpetuation.

PREFACE

1. A. C. Howell, "Sir Thomas Browne and Seventeenth Century Scientific Thought," *Studies in Philology*, XXII (1925), 61 ff.; A. Thaler, "Sir Thomas Browne and the Elizabethans," *Studies in Philology*, XXVIII (1931), 87 ff.; and G. K. Chalmers, "Sir Thomas Browne, True Scientist," *Osiris*, II (1936), 28 ff.—all discuss Browne's scientific method and its indebtedness to Bacon and Descartes. In chap. 2 we shall re-examine these conventional claims concerning Browne's scientific method. Chalmers in the above mentioned article, in "The Lodestone and the Understanding of Matter in Seventeenth Century England," *Philosophy of Science*, IV (1937), 75 ff., and in "Three Terms of the Corpuscularian Philosophy," *Modern Philology*, XXXIII (1936), 243 ff. also touches upon Browne's physics—his atomism and his researches in magnetism and electricity. The nature of Browne's atomism will be considered in chap. 5.

CHAPTER 1

1. *The Anatomy of Melancholy*, part 2, sec. 2, memb. 4.
2. *The Works of Sir Thomas Browne*, ed. Geoffrey Keynes (London: Faber and Gwyer, 1928-31), 6 vols.; IV, 7; I, 171-2. All references to Browne will be from this edition, unless otherwise indicated.
3. V, 213 f.
4. See V, 270 ff.; I, 157; III, 222, 224; III, 161-2. See H. H. Cawley, "Sir Thomas Browne and His Reading," *Publications of the Modern Language Association*, XLVIII (1933), 426-70.
5. V, 3-57.
6. I, 85; V, 83 f.
7. The term "virtuoso" was first applied to amateurs or dilettantes. About 1650 it was extended to include "sincere" inquirers into nature such as Boyle and other members of the Royal Society. In our discussion the term will be limited to its original meaning, as it is by Houghton, for whom the study of virtuosity is a study in sensibility. See Walter E. Houghton, "The English Virtuoso in the Seventeenth Century," *The Journal of the History of Ideas*, III (1942), 51-73; 190-219.
8. Evelyn, *Diary* for 29 Sept., 1645 and 17 Oct., 1671. See Geoffrey Keynes, *John Evelyn* (New York: Grolier Club, 1937), p. 27. See Browne, VI, 300. Evelyn asked Browne for help on his work on gardens (VI, 340). Though most of the correspondence between the two men has disappeared (VI, 298), we

know that Browne addressed to Evelyn at least one of his "Miscellany Tracts" (V, 53-7) and helped him in other ways from his vast stores of botanical lore. (VI, 299, 307.)

9. IV, 65; IV, 128; I, 110. Coleridge, *Literary Remains* (London: William Pickering, 1836), II, 415-16. See J. S. Finch, "Early Drafts of the Garden of Cyrus," *Publications of the Modern Language Association*, LV (1940), 742-7 and "Browne and the Quincunx," *Studies in Philology*, XXXVII (1940), 274-82.

10. IV, 4. See V, 215-17, 131-43.

11. I, 86-7; I, 33; II, 67-8.

12. Evelyn, *Diary and Correspondence*, ed. William Bray (London: H. G. Bohn, 1859), III, 92 (letter to Boyle, May 9, 1657). Browne, I, 77; I, 50-1. Bacon, *Nov. Org.*, Bk. II, Aph. XXI.

13. Houghton, "The English Virtuoso," p. 197, recognizes both the professional and the virtuoso-like aspects of Browne's activities: "I do not mean to imply that Browne is a virtuoso. In many respects he fails to fit the type—his serious concern with metaphysics, his Platonic and mystical turn of mind, both are far from the study of things as they are." Houghton mentions that Browne's science as well is evidence against his being a virtuoso, but adds, "To a considerable extent, however, Browne shares the tastes and sensibility of a typical virtuoso," and cites his taste for curious books and his "cabinet of rarities."

14. In chap. 3, it will be evident how amazingly full Browne's life was, in the time he could spare from his medical work, with observations and experiments, with reading and thinking in natural history, anatomy, and physiology. As for his works, his scientific tracts, his notebooks, and his letters are filled almost entirely with topics from natural history, anatomy, physiology, and chemistry; there is comparatively little from magnetism, electricity, and astronomy. (Thus see Vol. V, *passim*.) The same proportion holds in the *Pseudodoxia*. Among Browne's imaginative works, the *Garden of Cyrus* and the *Urn Burial* read, in large parts, like a biologist's notebook. The *Religio Medici* draws copiously upon his biology to support his philosophy.

15. T. M. Westfall, *Sir Thomas Browne's Revisions of the Pseudodoxia Epidemica, A Study in the Development of his Mind*, unpublished dissertation (Princeton, 1938), has found that in the later revisions of the *Pseudodoxia*, involving an expansion and alteration of old material, biology occupied Browne more and more. While the physical sciences received most attention in the early editions, from 1646 to 1650, biology received most attention in all succeeding editions till the last one of 1672. "His later interests in the biological sciences, as revealed in the revisions," Westfall concludes, "but confirms the evidence of the notebooks and certain parts of the *Garden of Cyrus* that Browne's interest in science became more and more biological." (P. 185.)

15. After receiving the Master of Art's degree at Oxford at the age of twenty-six, Browne turned to the study and practice of medicine. But the study drew him from the practice, and he was soon at the great continental medical

schools, at Montpellier, Padua, and Leyden, where in 1633, two years after receiving his Master's degree, he was created Doctor of Physick. He then practiced medicine for four years at Shipden Hall, near Halifax, apparently with success, for in 1637 he was incorporated Doctor of Physick at Oxford. It was then that he settled at Norwich, where, we are told, "he was much resorted to for his admirable skill in physick." (*Sir Thomas Browne's Works*, ed. Simon Wilkin [London: William Pickering, 1835-6], 4 vols.; I, xlv. Hereafter this edition will be referred to as "Wilkin.") In 1664, he was admitted *socius honorarius* of the College of Physicians and in 1671, he was knighted by Charles II. See Olivier Leroy, *Le Chevalier Thomas Browne* (Paris: Gamber, 1931).

16. IV, 4; II, 4; I, 17; VI, 256-7; VI, 277-8.

17. Cf. D'Arcy W. Thompson, in Aristotle, *Works* (Oxford, 1908-31), Vol. IV (*Historia Animalium*), p. vi: "Aristotle's work in natural history was antecedent to his more strictly philosophical work, and it would follow that we might proceed legitimately to interpret the latter in the light of the former." The physical and natural sciences occupy 1,477 pages, or fully one half of the corpus of Aristotle's writings. His father had been a physician and he had himself carried on researches in marine zoology.

18. W. D. Ross, *Aristotle* (London: Methuen, 1937), p. 118.

19. See John Herman Randall, Jr., "The Development of Scientific Method in the School of Padua," *The Journal of the History of Ideas*, I (1940), 177 ff.

20. Quoted by W. T. Sedgwick and H. W. Tyler, *A Short History of Science* (New York: Macmillan, 1917), pp. 269-70. One is amazed at the great number of the mysteries of nature which puzzled Browne that were being explained either at or just after his time; to name only a few: Grew considered sex in plants in 1671 and 1682; Redi gave the death blow to the doctrine of spontaneous generation in 1671; Ray classified plants and defined "species" in the 1680's, laying the foundation for Linnaeus' great system; Boyle, Hooke, Lower, and Mayow worked out the physiology of respiration in the 1660's.

21. VI, 277. Browne's medical training would have stressed anatomy. Leyden, where he gained his medical degree, was the great center of anatomic teaching in the seventeenth century. The immediate practical interest of his masterpiece, the *Urn Burial*, is the disclosure of the bones within the urns—"skulls, ribs, thigh-bones, and teeth" (thus see IV, 14). "In our study of Anatomy," he remarked, "there is a mass of mysterious Philosophy, and such as reduced the very Heathens to Divinity." (I, 46.) Browne's stress is that of his time. Physiology, an outgrowth of Harvey's doctrine of the circulation of the blood (with its subsequent concept of the feeding of tissues through the aid of digestion and respiration) did not become a separate science till Haller's time, in the eighteenth century. The first textbook on physiology was Descartes' *De L'Homme*, 1662.

22. In a field so beset with quackery, Browne's attitude is on the whole sane. Against quacks themselves he is bitter. (II, 30.) He objects to the filthy prescriptions which the materia medica of his day inherited from the past. (II,

270-1.) He is generally opposed to the use of amulets and charms in medicine and to astrological medicine, but is conservative enough not to reject the tradition of magic wholesale. (See II, 305, 157-8; V, 226, 262. The relation between Browne's magic and science will be considered in chap. 6, below.) In his prescriptions on diet his common sense is again evident. Taboos in foods, he argues, are based not on hygienic but on irrelevant grounds—on religion, custom, and superstition. (II, 284-6.)

23. II, 6.

24. See II, 59-60.

25. Of his authorities in the *Pseudodoxia* he says, "Nor have we indeed scarce named any Author whose name we do not honor." (II, 6.)

26. See Lynn Thorndike, *A History of Magic and Experimental Science* (New York: Macmillan, 1923), VI, 270 ff.

27. II, 5.

28. Bacon, *Adv. II. Works*, ed. J. Spedding, R. L. Ellis, and D. D. Heath (London, 1887-1902), III, 364. Cf. *De Augmentis, Works*, IV, 358. Browne, II, 3.

CHAPTER 2

1. I, 123; II, 40-1. The relation between the scientific and the religious aspect of Browne's quest for truth will be a principal theme of the discussion of Browne's philosophy, in Part II.

2. *Adv.*, Bk. I, in *Works*, III, 284-95; *Nov. Org.*, Bk. I, Aphorisms 38-70, in *Works*, IV, 53-72; *De Aug.*, V, 4, in *Works*, IV, 430.

3. Among recent writers, see Almonte C. Howell, "Sir Thomas Browne and Seventeenth-Century Scientific Thought," *Studies in Philology*, XXII (1925), 61 f.; Alwin Thaler, "Sir Thomas Browne and the Elizabethans," *Studies in Philology*, XXVIII (1931), 87 ff.; Gordon K. Chalmers, "Sir Thomas Browne, True Scientist," *Osiris*, II (1936), 38 f.; Basil Willey, *The Seventeenth-Century Background* (London, 1934), pp. 52 f. Although the assumption of Browne's indebtedness to Bacon is generally made, there is by no means agreement regarding the parallelisms between Bacon's idols and Browne's causes.

4. *Nov. Org.*, I, lx, *Works* IV, 61-2.

5. *Nov. Org.*, I, xlv, *Works* IV, 55.

6. II, 20.

7. II, 24 f.

8. II, 33; II, 34; Cf. II, 205-6.

9. Browne is aware of the semantic problem which Bacon treats in the Idols of the Market Place, though Browne does not consider it as one of the causes of error. In discussing the nature of devils, he makes a passing reference to this problem. The devils, he says, make use "of moral and Logical verities; that is, whether in the conformity of words unto things, or things unto their own conceptions, they practice truth in common among themselves." (II, 84.)

10. This fallacy does somewhat resemble the general fault of hasty induction from too few instances which Bacon criticizes in many places, among them in his *Idols of the Theatre*, where he accuses philosophical systems of it. Browne's words are: "This fallacy men commit when they argue from a particular to a general; as when we conclude the vices or qualities of a few upon a whole nation, or from a part unto the whole . . . or from the sign to the thing signified," as in idolatry. (III, 35-6.) However, the similarity ends here. Browne does not discuss Bacon's main topic, philosophical systems as falsifications of fact. Browne's debt, if any, therefore is, as usual, a most general one, not to a specific passage in Bacon but to Bacon's underlying principle of method for his "Instauration" of the sciences. Nor, need it hardly be added, are Browne's four real fallacies four *Idols of the Theatre*, as one critic claims. (Chalmers, "Sir Thomas Browne," p. 43.) Howell, "Sir Thomas Browne," pp. 63 f., curiously, omits the *Idols of the Theatre* altogether from his discussion of the influence of Bacon's idols on Browne's causes of error.

11. II, 38; II, 39 f.; II, 42-68; II, 68-77.

12. Bacon says that the *Idols of the Cave* "grow for the most part either out of the predominance of a favorite subject, or out of an excessive tendency to compare or to distinguish, or out of partiality for particular ages, or out of the largeness or minuteness of the object contemplated." (*Nov. Org.* I, lviii, in *Works* IV, 60.) We should remember also that the idols are not Bacon's only treatment of intellectual weaknesses, though their brilliancy of statement may lend itself easily to source attribution. The idols or false appearances are only one part of "the doctrine of the detection of fallacies," (*De Aug.*, *Works* IV, 429) the other two parts being the detection of *sophistical* fallacies and the detection of fallacies of *interpretation*, all discussed in the *De Augmentis*. In addition to the doctrine of the detection of fallacies, of which the idols are only one part, Bacon discusses other causes of error in other works—in the *Novum Organum* and in the *Advancement of Learning*. These causes include environment unfavorable to learning, lack of attention to natural philosophy, reverence for antiquity and authority, affectation of antiquity or novelty, study of words not matter, study of unprofitable subjects, over-early systematization of knowledge, pursuit of wrong goals ("the use and benefit of man" being the right goals), use of poor scientific method (dependence on reason rather than experience), impatience of doubt, superstitious fears, pusillanimity, and despondency. (See *Nov. Org.*, *Works* IV, 77-91; *Adv.*, *Works* III, 282-94.) Now all these causes show general similarities to as well as differences from those of Browne; they are certainly as close to, or as far from, Browne's analysis as is the discussion of the idols. Browne is not, as has been commonly claimed, specifically indebted to Bacon's idols for his analysis of the causes of error.

13. The analysis of causes of intellectual error is a favorite topic not only of Bacon and Browne but of their contemporaries as well. Lord Herbert of Cherbury published his *De Causis Errorum* in 1645, the year before the appearance

of the *Pseudodoxia*. And Joseph Glanvill, who was as responsive to the intellectual currents of his time as anyone, published in 1661 his *Vanity of Dogmatizing*, which is "a discourse of the Shortness and Uncertainty of our Knowledge, and its Causes." (*Vanity of Dogmatizing* [New York: Facsimile Text Society, 1931], title page.) Glanvill's analysis offers an interesting comparison to those of Bacon and Browne. As causes of error he lists the Fall, the difficulty of attaining truth, the deception of our senses, the deception of our imagination, the precipitancy of our understandings to hasty conclusions, and the influence of our "affections"—such as love, custom, interest, love for our own productions, reverence to antiquity and authority—on our understanding and judgment. Glanvill's analysis is often more penetrating than those either of Bacon or Browne, both of which it so closely resembles. The point here suggested is that *The Vanity of Dogmatizing* is the product of a tradition to which both Bacon and Browne contributed, but which Bacon did not necessarily originate in his striking metaphor of the idols.

14. See n. 19, below.

15. II, 195. Cf. II, 258. See II, 304; II, 64; II, 40. While "Experiment by sense" and "Enquiry by reason" are his main guides in science, faith and authority predominate over reason and sense for Browne in matters of religion. See I, 115; III, 328-30.

16. I, 123-4.

17. Such an explanation is made, for example, by Howell, who prints passages from Browne and Bacon and from Browne and Descartes, to prove that Browne was "an ardent disciple of Bacon and Descartes, making careful use of their philosophical ideas in his studies." ("Sir Thomas Browne," pp. 78-9.)

18. II, 219; IV, 124. Cf. II, 101.

19. Francis Johnson, *Astronomical Thought in Renaissance England* (Baltimore: Johns Hopkins Press, 1937), shows how these "Baconian" ideals were practised over a hundred years before the Royal Society was founded.

20. I, 124.

21. See Lynn Thorndike, *The History of Magic and Experimental Science*. We might note that the most important portion of Roger Bacon's *Opus Majus*, the sixth part, deals with experimental science.

22. See J. H. Randall, Jr., "Scientific Method in the School of Padua," *Journal of the History of Ideas*, I (1940), 177 ff.

23. Quoted by L. R. Wheeler, *Vitalism* (London: Witherby, 1939), p. 89.

24. III, 162; II, 32 f.; III, 46-7; II, 205-6; II, 269; II, 278-9.

25. II, 25; I, 123-4; I, 46.

26. *Nov. Org.* I, 1, *Works*, IV, 58.

27. Robert Boyle, *Works*, ed. Thomas Birch (London, 1772), 6 vols.; V, 539. Boyle continues "The outward senses are but the instruments of the soul . . . the sensories may deceive us . . . it is the part of reason, not sense, to judge whether none of the requisites of sense be wanting . . . and also it is the part

of reason to judge what conclusions may, and what cannot, be safely grounded on the information of the senses and the testimony of experience. So when it is said that experience corrects reason, it is somewhat an improper way of speaking: since it is reason itself that upon the information of experience, corrects the judgments she had made before."

28. II, 264-5; V, 244-5; VI, 277. Cf. II, 18-19, where Browne explains the Fall as due to the deception and overpowering of reason by the senses.

29. II, 52; Herbert's *De Veritate* would have been available to Browne before the appearance, in 1646, of the *Pseudodoxia*. Editions of Herbert's book appeared in 1624, 1643, and 1645.

30. See below, chap. 6.

31. II, 254; II, 237; II, 268.

32. II, 42; II, 50; II, 56; II, 55.

33. II, 275-6; II, 5-6.

34. II, 275-6; II, 231.

35. II, 195-6.

CHAPTER 3

1. II, 269, 262, 267, 270. For some of Browne's speculations and experiments on combustion, see II, 252, 147-53; III, 301, 249.

2. III, 267.

3. See William Harvey, *Works*, tr. Robert Willis (London: Sydenham Society, 1847), p. 330.

4. See IV, 89; V, 353.

5. Quoted by Joseph Needham, *A History of Embryology* (Cambridge, 1934). Browne has an interesting reference to this idea, though it is ambiguous with regard to the preformation—epigenesis issue: At the last day, he says, "shall appear the fertility of Adam, and the magick of that sperm that dilated into so many millions." (I, 59.)

6. VI, 293.

7. Browne here injects a curious idea into his discussion, an idea which combines the theory of preformation with his ideas on atomism, spontaneous generation, and panspermatism. The combination of preformation with spontaneous generation is a rather unusual one, difficult to understand. It is evident that Browne either did not consider the hypothesis of preformation seriously enough to try to assimilate it with his other ideas, or else that when he said spontaneous generation, he did not mean it. The characteristic of spontaneous or "equivocal" generation is that the creatures so produced are unlike their parents or source. Browne in fact stresses this characteristic of lack of resemblance between parents and offspring as crucial in his argument against the birth of a phoenix from a worm: this, he says, is to "confound the generation of perfect animals with imperfect . . . and erect Anomalies, disturbing the laws of Nature." (II, 224.) For the phoenix to arise from a worm would be to "confound" its generation

as a perfect animal, which arises from a parent like itself. (Cf. Harvey, *Works*, p. 170: Creatures spontaneously engendered are "equivocally engendered, as it is said, proceeding from parents unlike themselves.") How then could a pre-formed plant exist in a vegetable atom which is spontaneously generated from water? If the spontaneous generation were genuine, nothing in the water would resemble the ensuing plant. Such pseudospontaneous generation may be explained by the theory of panspermism, which Browne favored. According to this theory, the vegetable atom really left a mother plant, was dispersed by the elements, came to the water, and there developed into a plant resembling its real parent and only apparently by spontaneous generation from the water. Whether Brown did attempt such a reconciliation in his own mind when he made the observation to Power concerning the duckweed is, of course, open to question. It is possible that he did so, because he associated panspermism with water. (Cf. III, 210.) Such adventures of atoms containing miniature plants and animals Browne had adumbrated in the *Pseudodoxia*. (II, 265.) There "vital atoms" develop into plants and animals. Also "vegetable figurations, upon the sides of glasses, so rarely delineated in frosts" give evidence of preformation. Apparently the preformed miniatures are etched onto the glass when their matrix, the water, freezes. Small wonder that Power was stirred by this observation, which would seem to project, as onto a screen, a material embodiment of his ideas on preformation, to supply the lack of those magnifying glasses he so sorely missed. He wrote Browne that "it will be satisfaction enough to the greatest of my desires to behold the leaves . . . shadowed in glaciation, of which experiment I hope I shall have the happiness to be ocularly convinced at some opportunity by you." (VI, 282.) Highmore, who had first considered the primitive seed as an atom (Needham, *A History of Embryology*, pp. 107-8) and who inclined toward the doctrine of preformation, had already attempted to explain spontaneous generation by the action of such seminal atoms. Furthermore, Harvey had attempted to account for spontaneous generation by the action of seeds so small as to be invisible, dispersed by the wind, so that the animals which arise from them are supposed to be generated spontaneously simply because their ova cannot be found.

8. Caspar Friedrich Wolff's *Theoria Generationis* (1759), marked the beginning of the end of the doctrine of preformation. Epigenesis became popular toward the end of the eighteenth century, Kant ascribing the chief credit for establishing that doctrine to Blumenbach (1780). Recent attempts to deal with the problem of development avoid the extremes of these two doctrines. H. L. Wieman, *An Introduction to Vertebrate Embryology* (New York: McGraw-Hill, 1930), pp. 4-5, puts it thus: "There is now every reason for believing that the egg possesses organization expressed not in terms of embryo or adult morphology but, in many cases, in the form of a visible structural egg pattern and in an invisible molecular structure which makes the protoplasm of one species distinct from the protoplasm of another. . . . Preformation in its

modern garb takes the form of physicochemical organization; epigenesis, purged of vitalism, survives in the recognition of the importance in development of environmental factors, such as temperature, moisture, oxygen, food, etc."

9. IV, 114-15.

10. Harvey, *Works*, pp. 456-7.

11. Aristotle, *Works*, tr. J. A. Smith and W. D. Ross (Oxford, 1921), V (*De Generatione Animalium*) 734a 18 ff.

12. *Ibid.*, V, 724a 15 ff., 729a 10; 726b 16 ff.

13. *Ibid.*, V, 741b 8 ff. (Cf. 766b 12 ff.), 730b 10-15, 741b 5.

14. Harvey, *Works*, pp. 270-1, 457-8. Harvey appears to have been the first to use the term "epigenesis," employing first the form, "*per epigenesin*," in the Latin edition, 1651, of the *De Generatione*. In the English translation of 1653 the term "epigenesis" itself is used.

15. Browne agrees with Harvey, in opposition to Aristotle, that the female's function in generation is as important as the male's. See II, 82-3, 202. Cf. Harvey, *Works*, p. 300.

16. I, 63; III, 160-1. We shall see later that the Adam in the rib is a product of pangenesis—Browne's theory of heredity which is itself dependent upon the concept of the Idea.

17. III, 266. Such evidence of regeneration of new parts in animals caused the conversion to the doctrine of epigenesis of Hartsoecker, who previously had fancied he saw preformed little men, homunculi, in the sperm (1694); and of Blumenbach, the first important critic of preformation (1780).

18. II, 244-5.

19. IV, 97; II, 197-8.

20. Browne's theories of variation in the individual and in the species will be treated in a separate study.

21. T. J. Cole, *Early Theories of Sexual Generation* (Oxford: Clarendon Press, 1930), p. 156; Needham, *History of Embryology*, pp. 107-8.

22. II, 29-30; III, 160-1; III, 266.

23. *De. gen. an.*, V, 721b 5 ff. It is not meant to be here implied that Aristotle did not believe in the inheritance of mutations. He definitely did so believe, as he did also in the inheritance of acquired characters.

24. III, 266; III, 241; II, 208. The analogy of the microcosm has been implied in Browne's concept of the Idea in the seed and of the Idea in every part of the body. In each case the Idea was an epitome of the whole individual. The "contracted Adam" in the rib is another example. That the analogy between the Idea in the seed and that in the microcosm had already found a place in the Neoplatonic tradition from which Browne borrowed is indicated in Plotinus, whose "seminal reason" was so close to Browne's Idea in the seed. Plotinus said that just as the world-soul elaborates the cosmos, so "the reasons in the seeds fashion and form the living beings, as, in a way, little worlds." (Quoted by G. P. Conger, *Theories of Macrocosmus and Microcosmus in the History of*

Philosophy [New York: Columbia University Press, 1922], p. 22.) Browne himself makes an explicit association: "Nor need we fear this term, annihilation, or wonder that God will destroy the works of his Creation; for man subsisting, who is, and will then truly appear, a Microcosm, the world cannot be said to be destroyed. For the eyes of God, and perhaps our glorified selves, shall as really behold and contemplate the World in its Epitome or contracted essence, as now it doth at large and in its dilated substance. In the seed of a Plant, to the eyes of God and to the understanding of man, there exists, though in an invisible way, the perfect leaves, flowers and fruit thereof. . . ." (I, 63.)

25. VI, 292; IV, 89, 93-4; Cf. V, 353-4, 334-6, 293.

26. II, 303-4. Browne follows closely here the arguments of Aristotle, Harvey, and Fabricius. See Aristotle, *De. gen. an.*, V, 733b 1 ff.; Harvey, *Works*, p. 304. Hieronymus Fabricius ab Aquapendente, *The Embryological Treatises*, tr. Howard B. Adelmann (Ithaca, N.Y.: Cornell University Press, 1942), pp. 182-3.

27. VI, 166. See V, 358, 433, 435, 438, 439, 444; II, 304, 203; Needham, *History of Embryology*, p. 112. Browne also was one of the earliest naturalists systematically to collect and classify eggs.

28. Browne, II, 208; III, 241, 242. See Fabricius, *The Embryological Treatises*, p. 190; Aristotle, *De. gen. an.*, V, 726b 5 ff., 725b 4 ff., 735b 39 ff., 747a 2 ff., 736a 10 ff.

29. II, 224; II, 202-3; II, 225.

30. Aristotle, *De partibus animalium*, V, 681a 10 ff. Alexander Ross, *Arcana microcosmi* (1652), p. 155.

31. Paracelsus, quoted by A. W. Meyer, *The Rise of Embryology* (Palo Alto, Calif.: Stanford University Press, 1939), pp. 34 f.

32. II, 202-3; II, 306; II, 173.

33. Aristotle, *De. gen. an.*, V, 762a 15 ff.

34. III, 94; V, 334; VI, 293; II, 72; I, 20; I, 40-1.

35. I, 40.

36. III, 210; V, 427; V, 334; II, 265.

37. See n. 6, above.

CHAPTER 4

1. *Appreciations* (New York: Macmillan, 1918), p. 130.

2. For a history of theories of the imagination, especially of the romantic concept of the shaping power of imagination, origin of the modern psychological concept, here used, of the mind's creative synthesis, see Livingston Welch, *Imagination and Human Nature* (London: Kegan, Paul, French, Trubner, 1935). The term "imagination" is here used rather than the term "reason" (as in Santayana's "creative reason") partly because "reason" refers, among other things, to the objective Greek nous, the principle of universal order, whereas "imagina-

tion" refers more definitely to the romantic subjective and creative power here being discussed.

3. *De Aug.* Bk. III, chap. i.

4. For examples of Browne's deductive method, see below, chap. 6, the discussion of Browne's views on nature and his identification of the "laws of nature," with the "laws of reason." Browne's adherence to the Baconian and traditional empiricism, which has been already discussed (chap. 2) as one part of his scientific method, is, of course, a matter quite distinct from that of the actual functioning, conscious and unconscious, of his imagination, which is being here discussed. The former is concerned with his amassing of scientific experiences, the latter with the use his imagination made or failed to make of these experiences.

CHAPTER 5

1. I, 86.

2. II, 269, 261, 262; IV, 48-9; I, 41; I, 43; IV, 115. Cf. II, 200-1, 156-7. Browne's imagination was excited by the nature of light, its physical and metaphysical bearing. Might not starlight, phosphorescence, and the invisible flame of life have a common basis, he speculated; might they not even be convertible into each other? He experimented on combustion and on phosphorescence; meticulously he examined the glow worm for the source of its "flammeous light."

3. Aristotle, *De. gen. an.*, V, 726b 16 ff. Harvey, *Works*, pp. 457-8, 358. Browne, III, 310; II, 208; III, 160; II, 197-8; I, 63; I, 115.

4. Henry More, *Immortality of the Soul* (1659) Bk. III, chap. xii; Ralph Cudworth, *The True Intellectual System of the Universe* (1672), develop most fully the concept of plastic nature. Joseph Glanvill, *The Vanity of Dogmatizing* (New York: Columbia University Press, 1931), p. 43.

5. V, 433; I, 115. Cf. II, 279.

6. IV, 115.

7. IV, 48.

8. Edmund Spenser, *The Faerie Queene* Bk. III, canto VI; *Ruines of Rome*, XIII. Browne, I, 20; I, 49; V, 43; III, 267. See E. A. Greenlaw, "Spenser's Influence on *Paradise Lost*," *Studies in Philology*, XVII (1920), 320 ff.

9. John Milton, *Paradise Lost*, II, 9. Browne, V, 334; II, 25; III, 161.

10. Henry More, *Divine Dialogues*, 3d series, *Immortality of the Soul* Bk. III, chap. xii. Browne, I, 40; I, 44. W. P. Dunn, *Sir Thomas Browne, a Study in Religious Philosophy* (Menasha, Wis., 1926), considers the influence of various philosophic traditions on Browne, including that of the Cambridge Platonists.

11. F. A. Lange, *History of Materialism*, tr. E. C. Thomas (3d ed.; London: K. Paul, French, Trubner, 1897-8), I, 3, explains the dependence of materialism upon atomism. Charles T. Harrison, "The Ancient Atomists in English Literature of the Seventeenth Century," *Harvard Studies in Classical Philology*,

XLV (1934), 40 ff., shows how the Cambridge Platonists accepted atomism but drew from it different implications than did the materialists whom they attacked.

12. II, 99 ff.; II, 134-6. For evidence of the continuous, as distinguished from the atomic, effluvium, see G. B. Stone, "Atomic View of Matter in the Fifteenth, Sixteenth, and Seventeenth Centuries," *Isis*, X (1928), 445 ff.; G. K. Chalmers, "Three Terms of the Corpuscularian Philosophy," *Modern Philology*, XXXIII (1936), 243 ff.

13. II, 263; II, 259; IV, 105-6; II, 145; II, 201-2; II, 101.

14. IV, 41; VI, 66. Cf. I, 28.

15. II, 265; III, 266; VI, 293. Highmore quoted by Needham, *History of Embryology*, p. 108. For Browne "atom" can mean any small particle, as well as one of the indivisible particles constituting matter. See I, 135, 29, 13; II, 90-2, 263; V, 418, 197.

CHAPTER 6

1. I, 17-18; I, 145; I, 70.

2. I, 156. Cf. IV, 50; I, 97; I, 76.

3. II, 83-4; I, 41; I, 42; I, 80; III, 293; III, 295; I, 38. (Cf. II, 75-6). In 1664 Browne testified against a couple of old women at a witch trial.

4. I, 18. In his verses on God (I, 19), Browne also affirms "Unto none but Reason Can he'er be known."

5. I, 88; I, 20; I, 50; II, 229-30; I, 22; II, 293; II, 235. Cf. Aristotle, *Works*, V (*De partibus animalium*), 645a. Arguing that even the humblest animals are worthy of study, Aristotle remarks, "the resultant end of nature's generations and combinations is a form of the beautiful."

6. II, 52; II, 224.

7. II, 259; II, 206-7; I, 21; II, 279-80; II, 248.

8. II, 259; I, 22; V, 24; II, 214-15; I, 24-6.

9. I, 21; I, 17-18; I, 112. As one aspect of the teleological argument, this religious justification for the study of science was philosophically founded by Aristotle himself. In his *De partibus animalium* (*Works*, V, 645a ff.), Aristotle delivered himself as follows: "Having already treated of the celestial world . . . we proceed to treat of animals, without omitting . . . any member of the kingdom, however ignoble. For if some have no grace to charm the sense, yet even these, by disclosing to perception the artistic spirit that designed them, give immense pleasure to all who can trace links of causation, and are inclined to philosophy." Even Bacon gave his pronouncement on the study of nature as the second book of *God*, though none too convincingly, in view of his attack on final causes. The religious apologia depends upon the teleological view which Aristotle added, in his formal and final causes, to the material and efficient causes of Democritus and the ancient nature philosophers. This philosophy of Democritus Bacon placed highest. Bacon was driving toward mechanical causa-

tion; his real goal in the study of science was utility, the watchword of the new philosophy of the Royal Society: "that human life be endowed with new discoveries and powers." (*Nov. Org.*, I, lxxx.) Browne's position is still the old one. His causation is that of Aristotelian and Christian teleology; his goal in the study of science is a devout and learned admiration, a quest for the first cause. To stay with second causes, as Bacon recommended, to ascribe God's actions to nature, is to "let our hammers rise up and boast they have built our houses." (I, 22.)

10. II, 127-8; I, 39; II, 74. Bacon had already defended magic, placing it on the same plane with physics and mathematics. To restore magic to its "ancient and honourable meaning," Bacon defined it as "the science which applies the knowledge of hidden forms to the production of wonderful operations." (*De Aug.*, Bk. III, *Works*, IV, 366-7.) Bacon's criterion for this "natural magic"—the wisdom of the Magi—is like that of his science, utility; "true" natural magic urges men on to scientific discovery.

11. II, 225; II, 74; II, 157-8; V, 226-7; V, 262; II, 63; II, 80; II, 37; II, 268.

12. II, 127-8; II, 268; II, 145; II, 201; II, 300. In his attempt to rationalize magic, Browne is at one not only with Bacon but with such later advocates of the new philosophy as Glanvill and Digby, who also accounted for occult influences by the doctrine of effluvium. Conservative that he was, Browne could not lightly dismiss the authority of tradition. One of the signal features of his *Pseudodoxia* is its elaborate display of science for the disproof of palpable superstitions. To disprove the belief that the chameleon lives on air, he enters upon a learned disquisition on the nature of digestion and respiration. (II, 257-67; cf. II, 214, 296-7; V, 405, 337.) Sometimes the weight of tradition is too much for him and he succumbs: Elephants have written whole sentences and have also spoken because the anatomy of their vocal organs would allow this (II, 181-4); dogs and cats speak to witches (II, 183-4); the magical cure by music of the bite of the tarantula "we shall not at all question" (II, 305; cf. II, 306-7; 300-1; I, 60; VI, 85-6.) Browne's attitude toward magic is like that toward "authority," which he both attacks and utilizes as a test of truth. In both cases his strong conservatism constitutes part of the explanation for his ambivalent attitude, a conservatism illustrated in his religious, political, and social attitudes, his absolute submission to the Church (see I, 10, 14), his strong Royalist bias during the Commonwealth period (see I, 3; II, 292), and his boundless scorn for the "vulgar" multitude (see II, 28; I, 79, 73-4). The circumstances of his age constitute another part of the explanation for his partiality. To call him "credulous" would be to censure him for possessing a body of fact and a body of theory different from our own. The paucity of established fact led to scientific uncertainty. Browne's notebooks contain queries which may seem to us elementary, as "whether men more teeth than women" (V, 239). The scientific uncertainty which held him from a wholesale rejection of magic is well

illustrated in his discussion of the belief that the light of the glow worm can be translated to another body. After disproving it by "reason," he concludes that attempts to "make perpetual lights" from glow worms "we rationally doubt, though not so sharply deny." (II, 300-1.) This remark is characteristic. His favorite conclusion on a vulgar error is that "it admits of wide solution," or "it may yet further be considered." Browne's attitude toward magic is explained, further, by the nature of his theory. He accepted certain assumptions which have since his time been discarded, all the assumptions growing from the theory of correspondences between man and the rest of creation. These were only beginning to be questioned in Browne's day. The changing attitudes toward magic are well illustrated by the fact that though Pliny was regarded by even Browne as the fountain head of credulous beliefs, Pliny himself attacked magic as false, obscene, and criminal. (See Lynn Thorndike, *The Place of Magic in the Intellectual History of Europe* [New York, 1905], pp. 4, 44.) As in Browne's case, it is difficult to distinguish what Pliny regards as magical from what he regards as true. Browne himself attacks credulity as a cause of error (II, 31). Browne is caught in a changing tide, and under the impact of the new science, is in the enviable position in regard to magic of being aware of the uncertainty of his assumptions. (See Madelaine Doran, "On Elizabethan Credulity," *Journal of the History of Ideas*, I [1940], 151-76.)

13. I, 21; I, 43; I, 87; I, 63; III, 160-1. Browne indeed echoes Paracelsus quite distinctly, referring to the latter's "Microcosmical conceit" of the geographical orientation of the human body, and himself finds the dimensions of the heavens proportionable to those of the body (see II, 119; III, 28; I, 10, 91). Browne employs also the doctrine of signatures, of which Paracelsus was the great exponent, applying it to all nature and to man as a part of physiognomy: "there are mystically in our faces certain Characters which carry in them the Motto of our Souls." (I, 75.) By these signs "astrall Physiognomy" is explained. (See IV, 102, 103; I, 75, 126-7.)

14. I, 63; I, 46; IV, 117. John Donne, "The Second Anniversary," *The Progress of the Soul*, in *Poems*, ed. H. J. C. Grierson (London: Oxford University Press, 1933).

15. I, 21; I, 26. See D. K. Ziegler, *In Divided and Distinguished Worlds* (Cambridge, Mass.: Harvard University Press, 1943), who attempts to dissociate Browne's religion from his science, his "imaginative virtuosity" from his intellectual content.

CHAPTER 7

1. J. Downey, *Creative Imagination* (New York: Harcourt Brace, 1929); J. L. Lowes, *The Road to Xanadu* (Boston: Houghton Mifflin, 1927); F. C. Prescott, *Poetic Mind* (New York: Macmillan, 1922). See n. 2, chap. 4.

2. George Santayana, *Interpretations of Religion and Poetry* (New York: Scribners, 1900), chap. x.

3. I, 11, 7, 92, 91; III, 311; I, 95, 72 f., 89-90, 82, 87-8, 71. Browne's remark about music, says De Quincey, is, aside from the fine extravaganza on the subject in *Twelfth Night*, the only thing said adequately on the subject in all literature. ("The Pleasures of Opium," *Confessions of an English Opium Eater*.)

4. Among the possible reasons for Browne's artistic weaknesses the following are suggested: (1) The lack of a tradition of literary form. Browne's method of composition is "writing by Common Places" (II, 64). He kept copious notes of everything; in a letter to Edward he reveals his use of such notes, remarking of one he has just sent, "you may learn hereby how to improve a short narrative unto a discursive advantage." (VI, 91.) His own works are often patched up with sections from his notes and from his other works. (Thus cf. I, 81 ff. and I, 104 ff.) (2) The lack of an architectonic imagination. This is a weakness of Browne's artistic imagination similar to that mentioned in reference to his philosophic imagination. Browne's science and philosophy is as fragmentary as his art. His mind is eclectic, systematic, discursive, as well as quick, penetrating, and witty. Browne is, like Montaigne, Burton, and Fuller, like Lamb in the nineteenth century, an eccentric and romantic mind. Lamb has a revealing analysis of this type of mind in his "Imperfect Sympathies," an essay full of echoes of Sir Thomas Browne. Lamb contrasts his own partial illuminations with the unhesitating clockwork characteristic, for example, of the Scotch mentality. The owners of "anti-Caledonian" faculties, says Lamb, "have minds rather suggestive than comprehensive. They have no pretences to much clearness or precision in their ideas, or in their manner of expressing them. Their intellectual wardrobe (to confess fairly) has few whole pieces in it. They are content with fragments and scattered pieces of Truth. She presents no full front to them—a feature or side-face at the most. Hints and glimpses, germs and crude essays at a system, is the utmost they pretend to. . . . The light that lights them is not steady and polar, but mutable and shifting; waxing and again waning." (3) The lack of time. Browne's activities as a physician and scientist held him down. He complains of how he had to compose the *Pseudodoxia* "by snatches of time, as medical vacations, and the fruitless impertunity of uroscopy will permit us." (II, 4.) In his notebooks he often repeats himself within the same paragraph, thus suggesting that his composition was interrupted by his professional duties and then resumed. (Cf. V, 217-18.) That the concerns of the world weighed him down is evident in the unbroken practical tone of all his letters to his most intimate correspondent, Edward, where we miss the quiet, strong, poetic note of the *Urn Burial* and the *Religio Medici*. Browne's science had a restraining as well as an enriching influence. (4) The lack of interest in literary art. In spite of his erudition, Browne rarely mentions Chaucer, Shakespeare, Jonson, or any literary author in an esthetic or nonscientific connection. Like his approach to painting, his approach to poetry is literal. He criticizes it for creating false impressions; he inspects it for its content, rather than for its form. His reading is concentrated in works of learning and science. He feels that it were "no loss

like that of Galen's library" if all the works of all the poets had been lost; he favors a scientific rather than a humanistic program of education. (II, 67-8.) His own unimaginative but scientifically respectable son, Dr. Edward Browne, is the product of such a program. He seems unaware of his own literary quality; he betrays a certain lack of artistic consciousness when, in the opening of his *Brampton Urns*, he remarks about the *Urn Burial*: "I thought I had taken leave of urns when I had some years past given a short account of those found at Walsingham" (IV, 55), as though that were the claim to interest of the *Urn Burial*.

CHAPTER 8

1. See George Saintsbury, *A History of English Prose Rhythm* (London, 1912); J. N. Cline, "Hydriotaphia," *Five Studies in Literature*, "University of California Publications in English" (1940), VIII, 73-100; N. R. Tempest, "Rhythms in Sir Thomas Browne," *Review of English Studies*, III (1927), 308-18; n. 7, chap. 9.

2. I, 3. William Hazlitt, *Lectures on . . . the Dramatic Literature of the Age of Elizabeth*, Lecture VII. (*Collected Works*, ed. A. R. Waller and A. Glover [London: J. M. Dent, 1902-04]).

3. IV, 80; IV, 49; I, 149; IV, 44; IV, 45; IV, 125. See A. C. Howell, "Sir Thomas Browne as Wit and Humorist," *Studies in Philology*, XLII (1945), 564-77.

4. IV, 3; IV, 8; IV, 32. See M. L. Tildsley, "Sir Thomas Browne: His Skull, Portraits, and Ancestors," *Biometrika*, XV (1923), 3-76.

5. See Stephen J. Browne, *The World of Imagery* (London: Kegan, Paul, French, and Trubner, 1927), p. 25. Browne was acutely conscious of the nature of symbolism, repeatedly urging, throughout the *Pseudodoxia*, the dangers of literal interpretation, as a cause of error. Thus the griffin is not to be taken as a real animal, but "the original invention seems to be Hieroglyphical, derived from the Egyptian, and of an Higher signification. By the mystical conjunction of Hawk and Lion, implying either the Genial or sydereous Sun, the great celerity thereof, and the strength and vigour of its operations" (II, 218; cf. II, 196, 200-1, 256-7). Just as the griffin was a symbol for swiftness and strength, so all of nature's phenomena were but "mystical Letters" in her manuscript, symbols of the reality of God, and not to be taken literally as real in themselves.

6. I, 24; IV, 47; IV, 45; I, 8; I, 72; I, 74; IV, 40. For mathematical and astronomical images in the *Religio Medici* and the *Urn Burial*, see I, 22, 52, 64, 89-90, 91, 8, 10, 24, 92; IV, 43, 47, 50, 37, 45. Curiously, there is little mathematical imagery where we might most expect to find it, in *The Garden of Cyrus*, though the "decussation" is often enough referred to. For geographical images, see I, 10, 72.

7. IV, 47, 46, 48, 49. For a discussion of the "sunken image" see Henry W. Wells, *Poetic Imagery* (New York: Columbia University Press, 1924), p. 30.

8. I, 122, 137, 117, 127. For other biological images in the *Christian Morals*, see I, 135-6, 159, 101, 104-5, 138, 136. Abstract astronomical images are relatively abundant in the *Christian Morals*; see I, 106, 108, 109, 112, 117, 130, 137-8, 141, 144, 146, 153-4, 159. The *Christian Morals* has also a few images from magnetism: I, 182, 104; and from geography: I, 101, 111, 144, 158.

9. John Keats, Letter to Reynolds, 3 May, 1818. See Irwin Edman, *Arts and the Man* (New York: W. W. Norton, 1928), pp. 107 ff.

10. T. S. Eliot, gives the following account of what he calls the "auditory imagination": ". . . the feeling for syllable and rhythm, penetrating far below the conscious levels of thought and feeling, invigorating every word, sinking to the most primitive and forgotten, returning to the origin and bringing something back, seeking the beginning and the end. It works through meanings, certainly, or not without meanings in the ordinary sense, and fuses the old and obliterated and trite, the current and the new and surprising, the most ancient and the most civilized mentality." (Quoted by F. O. Matthiessen, *The Achievement of T. S. Eliot* [London: Oxford University Press, 1935], p. 81.)

11. See Marjorie Nicolson, "Milton and the Telescope," *English Literary History*, II (1935), 1 ff. Thomas De Quincey, "Rhetoric," *De Quincey's Literary Criticism*, ed. H. Darbyshire (London: H. Frowde, 1909).

12. IV, 43; IV, 45.

CHAPTER 9

1. IV, 4; I, 54; I, 48; IV, 32-3.

2. II, 202-3; II, 173; II, 225; I, 20; I, 129; III, 161.

3. II, 301; II, 206-7; II, 208-9; III, 181-2; III, 66; IV, 43. Cf. II, 249.

4. I, 176, 178, 188, 170, 177, 168, 169, 179. For Browne's scientific observations on dying in animals and men, see I, 130-1; V, 253; III, 31, 34; II, 298-9.

5. I, 51, 53, 62-3, 70, 59, 50, 15.

6. IV, 32. See W. H. Barnes, "Sir Thomas Browne's *Hydriotaphia* with Reference to *Adicopere*," *Isis*, XX (1934), 337-43.

7. See Morris Croll, "Attic Prose in the Seventeenth Century," *Studies in Philology*, XVIII (1921), 79-128; R. F. Jones, "Science and Language in England in the Middle of the Seventeenth Century," *Journal of English and Germanic Philology*, XXXI (1932), 315-31; D. L. Clark, *Rhetoric and Poetic in the Renaissance* (New York: Columbia University Press, 1922); W. G. Crane, *Wit and Rhetoric in the Renaissance* (New York: Columbia University Press, 1937); Sister Miriam Joseph, *Shakespeare's Uses of the Arts of Language* (New York: Columbia University Press, 1947).

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